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Areawide Environmental Quality Management (AEQM) Plan for Dhanbad-Bokaro Area

Final report (Annexure Volume)

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Energy-Environment Interface
Tata Energy Research Institute

List of annexures

Annexure 2.1 The present public roads network in the JCF

No.	Road stretch	Type/Name	Length (km)
1.	Gobindpur-Rajganj-Topchanchi	NH-2	36
2.	Barwada-Dhanbad (NH bypass)	NH-2	9
3.	Gobindpur-Dhanbad-Lohpiti-Chas	NH-32	52
4.	Chas-Bokaro	NH-23	20
5.	Gobindpur-Baliapur-Sindri	PWD	24
6.	Mugma-Chirkunda (NH-2 part of PWD)	PWD	7
7.	Chirkunda-Panchet	PWD	8
8.	Baliapur-Patalabadi-Chirkunda	PWD	29
9.	Dhanbad-Patheridih-Sindri	PWD	25
10.	Chas-Gobindpur (Urban areas only)	PWD	7
11.	Jharia-Baliapur	PWD	11
12.	Gobindpur-Tundi-Giridih	PWD	28
13.	Chas-Chandan Kyari	PWD	26
14.	Patheridih-Chandan Kyari-Bermasiya	PWD	28
15.	Baliapur-Sindri (Agri. road)	PWD	3
16.	Rajganj-Katras-Jamadiha (Mahuda)	PWD	20
17.	Pootkee-Bhagha-Bhowra-Sudamdih-Phus bungalow link road	PWD	14
	Total		347

Annexure 2.2 Roads constructed by BCCL under HIRAK project

No.	Name of road	Length (km)	Cost (Rs million)
1.	Lohpiti-Chandrapura (new alignment)	10.392	71.00
2.	Dumra-Chandrapura up to 'T' Jn. (new align)	10.200	67.20
3.	Dumra-Jhagrahi-Katrasgarh (new alignment)	8.645	31.13
4.	Bhatmurna-Katrasgarh-Panchgarhi Sijua-Kirkend (existing road)	13.933	49.67
5.	Sijua-Rajganj (existing road)	9.110	25.84
7.	Kanko-Tetulmari-Bhuli-Dhanbad (new align)	18.160	68.53
8.	Kendua-Jharia (existing rd. new align.portion)	9.360	11.53
9.	Golukdih-Jeenagora (exist. road)	2.963	1.16
10.	Dumra-Kesargarh (resurfacing)	5.076	2.68
11.	.Chandrapura-Phusro	8.268	45.47
12.	Development of BCCL township roads (resurf)	5.816	5.20
13.	Koylanagar township to S-P road (new alignment)	1.720	4.50
	Total	103.643	383.91

Annexure 2.3 Details of existing railway sidings in BCCL

No.	Name of the siding	Capacity			Name of colliery project/washery	Linkage		Type of coal
		Box N	Box C	FW		Mode	Consumer	
	I.S.E Railway (ADRA)							
1.	Albioan I	58			Damoda	Truck	P/House	Non-coking
2.	Benedih 6	58			Nudkhurkee & Block II	Truck	P/House	Non-coking
3.	KKC (L)	58			Phularitand & Benedih	Truck	P/House	Non-coking
4.	Nawagarh No. 1		26		K Choitudih	Truck	Dugda washery	Coking
5.	Nawagarh No. 3			25	K Choitudih	Pit head	Industries	H/coke
6.	Pootkee No. 16			52	Pootkee	Truck	Bhojudidh washery	Coking
7.	J Balihari No. 2	58			Balihari	Truck	SAIL	Coking
8.	K B No. 11		30		Gopalichak	Truck	Bhojudidih washery	Coking
9.	Loyabad CP No. 28			25	Loyabad CP	Pit head	Industries	H/coke
10.	Kankanee 2, 3 & 4			52	Kankanee	Truck	Bhojudih washery	Coking
11.	Kustore 7			52	Kustore	Truck	Bhojudih washery	Coking
12.	Burragarh 1			52	Burragarh/KOCP	Truck	Bhojudih washery	Non-coking
13.	Bhowrah 2			12	Bhowrah	Truck	Bhojudih washery	SLV
14.	Bhowrah 4			40	Bhowrah	Truck	Bhojudih washery	Coking
15.	Bhowrah 5			45	Bhowrah	Truck	Bhojudih washery	Coking
16.	Bhowrah 6			25	Bhowrah	Truck	Bhojudih washery	Coking
17.	Bhowrah 16			25	Bhowrah	Truck	Bhojudih washery	Coking
18.	Amlabad			52	Amlabad	Truck	Bhojudih washery	Coking
19.	Murulidih 20/21 sdg	52			Mohuda washery	Belt cony	Steel plant/P House	WC middling
20.	Sudamdih washery sdg	58			Sudamdih washery	Conveyor	Steel plant/P House	Washed & middling
21.	Sudamdih NCDC sdg		35		Damodar OCP	Pit head	Fertiliser/P House	Non-coking
22.	Moonidih washery sdg	58			Moonidih washery	Conveyor	Steel Plant/P House	Washed coal
23.	Bhojudih M Yard	58			Bhojudih washery	Conveyor	Steel plant	Washed coal

No.	Name of the siding	Capacity			Name of colliery project/washery	Linkage		Type of coal
		Box N	Box C	FW		Mode	Consumer	
	II. Eastern Railyway (Dhanbad & Asansol)							
24.	Kessurgarh	58			Block II & JOCP	Truck	P House	Non-coking
25.	Phulantand		20		Phularitand	Truck	Dugda	Coking
26.	Dugda M Yard*	58			Dugda washery	Conveyor	Steel plant	Washed coal
27.	Jogta		20		Mudidih	Truck	Dugda washery	Coking
28.	Telutya	58			Teturiya & S Gonvindpur	Truck	Dugda washery	Coking
29.	Jamunla		40		Block II	Truck	Dugda	Coking
30.	Maheshpur		30		Block IV, Kharkharee	Truck	Dugda	Coking
31.	Muraidih	58			Muraidih	Truck	P House	Non-coking
32.	Barora washery sdg		35		Barora washery	Truck	B Steel/TPS	WC/Middling
33.	Khas tundoo	58			Jogidih & Maheshpur	Truck	P House/Fer	Non-coking
34.	Govindpur	58			Govindpur/ A Kinari	Truck	Cement/BRK/PH	Non-coking
35.	Sonardih (not in use)		18					
36.	Ramkanall N/S	58						
37.	West Katras (Kat CHP)		44		Ramkanali, Salanpur & Keshalpur	Truck	P House & Fertiliser	Non-coking
38.	Salanpur (not in use)		30		Katras Project	Conveyor	Dugda washery	Coking
39.	Sijua stabling	58			West Mudidih	Truck	Cement/BRK	Non-coking
40.	Sijua Mudidih		25		Mudidih	Truck	P House & Fertiliser	Non-coking
41.	Angarpathra North		20		Angarpathra/ G tand	Truck	Dugda washery	Coking
42.	Nichitpur	58			Noichitpur/ Tetulmari	Dumper/ T	P H/Ferti/BRK	Non-coking
43.	E Bussuriya A (in use)		12					
44.	Chota Bowua (in use)		17					
45.	E Busouriya P (not in use)		16					
46.	Khas Kusunda (in use)		35					

No.	Name of the siding	Capacity			Name of colliery project/washery	Linkage		Type of coal
		Box N	Box C	FW		Mode	Consumer	
48.	Gareria sludge	58			Sendra Bansjora	Truck	Dugda washery	Coking
49.	RCA-Goppalichuck (not in use) dismantled			45				
50.	Dobari No 2		20		E Bhuggat/ Ena/ Kustore	Truck	Patherdih washery	Coking coal
51.	Dhansar (Dhansar CHP)	58			KOCP	Truck	Power House	Non-coking
52.	Liberty/ victory	58			Bastacolla	Truck	Power House	Non-coking
53.	Bastocolla (P) dismantled		44		Bastacolla, Bera	Truck	Power House	Non-coking
54.	Dobari No.3 (not in use)		9					
55.	JG No.15		12		Jeenagora	Truck	Industries	H coke
56.	JG No.12			10	S Tisra	Pit-head	Industries	H coke
57.	JG No.14		11		Jenagora	Truck	Power House	Non-coking
58.	Central Kujama (West)	58			GOCP	Truck	Power House	Non-coking
59.	Central Kujama (East)			35	GOCP	Dumper	Path washery	Coking
60.	Ghanudih I and II		44		Ghanudih	Truck	Power House	Non-coking
61.	JG No.6	58			N Tisra	Truck	Power House	Non-coking
62.	JG No.9	58			S Tisra	Truck	Power House	Non-coking
63.	RD Mehta			8	Bararee	Truck	Path washery	Coking
64.	Bararee East and West			36	Bararee	Truck	Path washery	Coking
65.	Lodna 1 and 7		35		Lodna washery	Conveyor	IISCO/ P House	WC/Middling
66.	Lodna CP			15	Lodna CP	Pit-head	Industries/Loco	H coke
67.	Lodna No.9		30		Bagdigi	Truck	Path washery	Coking
68.	Loyabad No.1		20		Loyabad	Truck	DSP	Coking
69.	Patherdih M Yard		44		Path washery	Conveyor	Steel Plant/PH	WC/Middlings
70.	Jograd (Junkunder CHP)		44		Basantimata/ Dahibari	Truck	Power House	Non-coking
71.	Laikdih deep		26		NLOCP/ Dahi/ Basantimata	Dumper	Power House	Non-coking
72.	New Laikdih deep/ Dahi		12		NLOCP/ Basatimata/ Dahi	Dumper	DSP/DCOP	Coking
73.	New Damagoria	58			Damogoria	Truck	Power House	Non-coking

* Washed coal section being maintained by SE Railway only.

Annexure 2.4 Present conditions (circa 1991) - basic data cell group summaries

CELL #	Units	1a-1b	1c	1d	2a-2b	2c	2d	3a	3b	3c	3d	4a-4b	4c	4d	5	6	7	8a	8b	8c-8d
HOUSEHOLDS	#	11000	40000	40000	11000	40000	6000	6000	6000	6000	6000	23000	49000	11000	23000	85000	23000	49000	49000	12000
COAL MINING																				
Open Cast	Mt	0 0	3 3	2 3	0 0	5 1	0 0	5 3	2 7	0 0	0 9	0 0	3 5	1 9	0 0	0 0	0 0	1 6	0 0	0
Overburden (loose)	Mm³	0 0	12 3	8 1	0 0	8 3	0 0	15 0	5 3	0 0	3 4	0 0	11 9	4 2	0 0	0 0	0 0	4 0	0 0	0
Underground	Mt	0 0	0 7	0 3	0 0	0 2	0 0	0 2	2 0	0 5	3 2	0 0	2 3	0 7	0 0	0 0	0 0	2 3	0 5	0
Land damaged due to mining (status as of circa 1991)																				
Working Pits	ha	0	60	120	0	60	0	280	143	0	46	0	188	99	0	0	0	86	0	0
Overburden dumps	ha	0	180	360	0	180	0	100	34	1	0	0	199	57	0	0	0	50	0	0
Coal dumps	ha	0	60	20	0	210	0	120	170	7	100	0	320	247	0	0	0	74	0	0
Subsided land	ha	0	0	0	0	0	0	282	604	175	541	0	1354	166	0	0	0	373	0	0
Mine fires	ha	0	0	0	0	0	0	102	142	0	325	0	870	87	0	0	0	207	0	0
Abandoned Pits	ha	0	0	0	0	0	0	26	135	11	44	0	173	0	0	0	0	89	0	0
Reclaimed land	ha	0	0	0	0	0	0	54	433	87	798	0	413	346	0	0	0	343	0	0
RIVER MINING																				
Sand	Mt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0
WASHERIES																				
Raw coal feed	Mt	0	2 98	2 53	0	0	0	0 28	0	2 57	0	0	0 36	0	0	0	0	4 17	2 6	0
Rejects	Mt	0	0 55	0 46	0	0	0	0 09	0	0 22	0	0	0 08	0	0	0	0	0 57	0 82	0
Reject spills	%	0	25	10	0	0	0	0	0	0	0	0	0	0	0	0	0	25	10	0
Coal spills	%	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
POWER PLANTS (3 possible power plants in each cell)																				
PP-1 Activity	GWh	0	688	0	0	0	2011	0	0	0	0	0	0	0	0	0	0	90	194	0
PP-1 Dis factor	kg/kWh	0 00	0 07	0 00	0 00	0 00	0 06	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 10	0 09	0 00
PP-1 Ash factor	kg/kWh	0 00	0 35	0 00	0 00	0 00	0 29	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	1 18	0 72	0 00
PP-1 Ash Spills	%	0	50	0	0	0	50	0	0	0	0	0	0	0	0	0	0	5	10	0
PP-2 Activity	GWh	0	1369	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PP-2 Dis factor	kg/kWh	0 00	0 02	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
PP-2 Ash factor	kg/kWh	0 00	0 25	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
PP-2 Ash Spills	%	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Annexure 2.4 contd.

CELL #	Units	1a-1b	1c	1d	2a-2b	2c	2d	3a	3b	3c	3d	4a-4b	4c	4d	5	6	7	8a	8b	8c-8d
PP-3 Activity	GWh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PP-3 Dis factor	kg/kWh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PP-3 Ash factor	kg/kWh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PP-3 Ash Spills	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER INDUSTRIES																				
Steel Plant	t	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4000000	0	0	0	0
Fertilizer Plant	t	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	300000	0
Explosive factory	t	0	40000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hard coke	t	0	0	0	0	0	0	4300	18000	0	108600	400000	103000	0	0	0	0	46000	0	0
Softcoke	t	0	9000	0	0	133000	0	6500	0	0	8100	300000	22600	19300	0	0	0	0	0	0
TRANSPORT																				
Rail movements		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Road movements																				
Sand movement	Mtkm	0	0	0	0	0	0	0	0	0	7	0	14	0	0	0	0	18	9	0
NH-traffic																				
Passenger	Mtkm	0	0	0	0	0	0	0	0	45	45	437	45	0	155	155	90	0	0	0
Freight	Mpkm	0	0	0	0	0	0	0	0	209	209	627	209	1	111	111	418	0	0	0
Other freight	Mtkm	2	8	8	2	8	1	1	1	1	1	4	10	2	4	18	4	10	10	0
RIVER DISPOSAL in kg/ day (3 possible sampling locations in each cell)																				
1	TSS	0	500	84000	0	900	683000	0	0	24400	0	0	80	0	0	437000	340000	722000	607000	0
1	COD	0	230	30000	0	530	349000	0	0	104000	0	0	130	0	0	63000	115000	124000	142000	0
1	BOD	0	30	300	0	30	1800	0	0	20	0	0	30	0	0	900	3060	2400	10200	0
2	TSS	0	36000	5770000	0	1291000	627000	0	0	132000	0	0	0	0	0	0	0	10700	0	0
2	COD	0	5000	1647000	0	647000	190000	0	0	71000	0	0	0	0	0	0	0	3400	0	0
2	BOD	0	100	2000	0	1500	2500	0	0	5400	0	0	0	0	0	0	0	500	0	0
3	TSS	0	1357000	1700000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	COD	0	714000	868000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	BOD	0	700	900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note

1 All values are annual except river disposal, which is daily

2 River disposal values, average daily amounts, are based upon field data collected during January only

3 Power plants operating data was collected from the individual power plants during field visits

Annexure 2.5 Present conditions (circa 1991) - basic data and residual generation - cell-wise

Cell	Activity	Level of Activity		Estimated unit Discharge		Estimated or Reported Discharge		Parameter	Comments
		PRESENT (circa 1991)							
Cell	HOUSEHOLDS	11000	Units						
	Cookstoves			45	kg/hld	1	t/d	SPM	Low elevation discharge
1a-1b	Hld solids			2	kg/hld	22	t/d	SW	Household solid waste
	COAL MINING								
	Open Cast	0	Mt	0	kg/t	0	t/d	SPM	Low elevation discharge
	Overburden	0	Mm³						
	Underground	0	Mt						
	Land damaged due to mining								
	Working Pits					0	ha	Land	
	Overburden dumps					0	ha	Land	
	Coal dumps					0	ha	Land	
	Subsided land					0	ha	Land	
	Mine fires					0	ha	Land	
	Abandoned Pits					0	ha	Land	
	Reclaimed land					0	ha		
	RIVER MINING								
	Sand	0	Mt			0	Mt	Sand	
	COAL WASHERIES	0	Mt						
	Rejects					0	t/d	SW	Washery rejects
	Reject spills					0	t/d	LW	rejects slurry
	Coal spills					0	t/d	LW	coalfines slurry
	POWER PLANTS								
	PP-1 Emissions	0	GWh	0.00	kg/kWh	0	t/d	SPM	High elevation discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry
	PP-2 Emissions	0	GWh	0 00	kg/kWh	0	t/d	SPM	High elevation discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry
	PP-3 Emissions	0	GWh	0.00	kg/kWh	0	t/d	SPM	High elevation discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					3	t/d	SPM
Colliery road	0	Mtkm	0.120	kg/tkm	0	t/d	SPM
PWD Passenger	55	Mpkm	0.018	kg/pkm	3	t/d	SPM
PWD Freight	2	Mtkm	0 040	kg/tkm	0	t/d	SPM
NH-Passenger	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Freight	0	Mtkm	0 008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	40000 Units				
	Cookstoves		45 kg/hld	5 t/d	SPM	Low elevation discharge
1c	Hld solids		2 kg/hld	80 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	3.3 Mt	2.4 kg/t	22 t/d	SPM	Low elevation discharge
	Overburden	12.3 Mm³				
	Underground	0.7 Mt				
	Land damaged due to mining					
	Working Pits			60 ha	Land	
	Overburden dumps			180 ha	Land	
	Coal dumps			60 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	2.98 Mt				
	Rejects			1507 t/d	SW	Washery rejects
	Reject spills			377 t/d	LW	rejects slurry
	Coal spills			82 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	688 GWh	0.07 kg/kWh	132 t/d	SPM	High elevation discharge
	Flyash trapped			396 t/d	SW	Converted to LW
	Bottom ash			132 t/d	SW	Converted to LW
	Ash spills			264 t/d	LW	Ash slurry
	PP-2 Emissions	1369 GWh	0.02 kg/kWh	75 t/d	SPM	High elevation discharge
	Flyash trapped			675 t/d	SW	Converted to LW
	Bottom ash			188 t/d	SW	Converted to LW
	Ash spills			431 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	40000	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	9000	t	39	kg/t	1	t/d	SPM
TRANSPORT							
Rail movements	40000						
Road movements-total					17	t/d	SPM
Colliery road	20	Mtkm	0.120	kg/tkm	7	t/d	SPM
PWD Passenger	200	Mpkm	0 018	kg/pkm	10	t/d	SPM
PWD Freight	8	Mtkm	0 040	kg/tkm	1	t/d	SPM
NH-Passenger	0	Mpkm	0 004	kg/pkm	0	t/d	SPM
NH-Freight	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					500	kg/d	TSS
					230	kg/d	COD
					30	kg/d	BOD
					36000	kg/d	TSS
					5000	kg/d	COD
					100	kg/d	BOD
					1357000	kg/d	TSS
					714000	kg/d	COD
					700	kg/d	BOD

Annexure 2.5 contd.

Cell	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
	HOUSEHOLDS	40000 Units				
	Cookstoves		45 kg/hld	5 t/d	SPM	Low elevation discharge
1d	Hld solids		2 kg/hld	80 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	2.32 Mt	2.4 kg/t	15 t/d	SPM	Low elevation discharge
	Overburden	8.1 Mm³				
	Underground	0.34 Mt				
	Land damaged due to mining					
	Working Pits			120 ha	Land	
	Overburden dumps			360 ha	Land	
	Coal dumps			20 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	2.53 Mt				
	Rejects			1260 t/d	SW	Washery rejects
	Reject spills			126 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					15	t/d	SPM
Colliery road	13.3	Mtkm	0.120	kg/tkm	4	t/d	SPM
PWD Passenger	200	Mpkm	0 018	kg/pkm	10	t/d	SPM
PWD Freight	8	Mtkm	0.040	kg/tkm	1	t/d	SPM
NH-Passenger	0	Mpkm	0 004	kg/pkm	0	t/d	SPM
NH-Freight	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					_ 000	kg/d	TSS
					30000	kg/d	COD
					300	kg/d	BOD
					5770000	kg/d	TSS
					1647000	kg/d	COD
					2000	kg/d	BOD
					1700000	kg/d	TSS
					868000	kg/d	COD
					900	kg/d	BOD

Annexure 2.5 contd.

	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments·
Cell	HOUSEHOLDS	11000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low elevation discharge
2a-2b	Hld solids		2 kg/hld	22 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low elevation discharge
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects			0 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	0 t	5.4 kg/t	0 t/d	SPM
Softcoke	0 t	39 kg/t	0 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements-total			3 t/d	SPM
Colliery road	0 Mtkm	0.120 kg/tkm	0 t/d	SPM
PWD Passenger	55 Mpkm	0 018 kg/pkm	3 t/d	SPM
PWD Freight	2 Mtkm	0.040 kg/tkm	0 t/d	SPM
NH-Passenger	0 Mpkm	0.004 kg/pkm	0 t/d	SPM
NH-Freight	0 Mtkm	0.008 kg/tkm	0 t/d	SPM
River Disposal				
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

Annexure 2.5 contd.

	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	40000 Units				
	Cookstoves		45 kg/hld	5 t/d	SPM	Low elevation discharge
2c	Hld solids		2 kg/hld	80 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	5.1 Mt	2 4 kg/t	34 t/d	SPM	Low elevation discharge
	Overburden	8.3 Mm³				
	Underground	0.2 Mt				
	Land damaged due to mining					
	Working Pits			60 ha	Land	
	Overburden dumps			180 ha	Land	
	Coal dumps			210 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects			0 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	133000	t	39	kg/t	14	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					20	t/d	SPM
Colliery road	26.5	Mtkm	0.120	kg/tkm	9	t/d	SPM
PWD Passenger	200	Mpkm	0.018	kg/pkm	10	t/d	SPM
PWD Freight	8	Mtkm	0.040	kg/tkm	1	t/d	SPM
NH-Passenger	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Freight	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					900	kg/d	TSS
					530	kg/d	COD
					30	kg/d	BOD
					1291000	kg/d	TSS
					647000	kg/d	COD
					1500	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	6000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low elevation discharge
2d	Hld solids		2 kg/hld	12 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low elevation discharge
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects			0 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	2011 GWh	0.06 kg/kWh	331 t/d	SPM	High elevation discharge
	Flyash trapped			948 t/d	SW	Converted to LW
	Bottom ash			320 t/d	SW	Converted to LW
	Ash spills			634 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					2	t/d	SPM
Colliery road	0	Mtkm	0.120	kg/tkm	0	t/d	SPM
PWD Passenger	30	Mpkm	0.018	kg/pkm	2	t/d	SPM
PWD Freight	1	Mtkm	0.040	kg/tkm	0	t/d	SPM
NH-Passenger	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Freight	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					683000	kg/d	TSS
					349000	kg/d	COD
					1800	kg/d	BOD
					627000	kg/d	TSS
					190000	kg/d	COD
					2500	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	6000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low elevation discharge
3a	Hld solids		2 kg/hld	12 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	5.28 Mt	2.4 kg/t	35 t/d	SPM	Low elevation discharge
	Overburden	15 Mm³				
	Underground	0 24 Mt				
	Land damaged due to mining					
	Working Pits			280 ha	Land	
	Overburden dumps			100 ha	Land	
	Coal dumps			120 ha	Land	
	Subsided land			282 ha	Land	
	Mine fires			102 ha	Land	
	Abandoned Pits			26 ha	Land	
	Reclaimed land			54 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0.28 Mt				
	Rejects			247 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	4300	t	5.4	kg/t	0	t/d	SPM
Softcoke	6500	t	39	kg/t	1	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					11	t/d	SPM
Colliery road	27.6	Mtkm	0.120	kg/tkm	9	t/d	SPM
PWD Passenger	30	Mpkm	0.018	kg/pkm	2	t/d	SPM
PWD Freight	1	Mtkm	0 040	kg/tkm	0	t/d	SPM
NH-Passenger	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Freight	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

Cell	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell 3b	HOUSEHOLDS	6000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low elevation discharge
	Hld solids		2 kg/hld	12 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	2.69 Mt	2.4 kg/t	18 t/d	SPM	Low elevation discharge
	Overburden	5.3 Mm³				
	Underground	2 Mt				
	Land damaged due to mining					
	Working Pits			143 ha	Land	
	Overburden dumps			34 ha	Land	
	Coal dumps			170 ha	Land	
	Subsided land			604 ha	Land	
	Mine fires			142 ha	Land	
	Abandoned Pits			135 ha	Land	
	Reclaimed land			433 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects			0 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	18000	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					9	t/d	SPM
Colliery road	23.45	Mtkm	0.120	kg/tkm	8	t/d	SPM
PWD Passenger	30	Mpkm	0.018	kg/pkm	2	t/d	SPM
PWD Freight	1	Mtkm	0.040	kg/tkm	0	t/d	SPM
NH-Passenger	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Freight	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

Cell	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
	HOUSEHOLDS	6000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low elevation discharge
3c	Hld solids		2 kg/hld	12 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low elevation discharge
	Overburden	0 Mm³				
	Underground	0 52 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			1 ha	Land	
	Coal dumps			7 ha	Land	
	Subsided land			175 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			11 ha	Land	
	Reclaimed land			87 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	2.57 Mt				
	Rejects			603 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					8	t/d	SPM
Colliery road	2.6	Mtkm	0.120	kg/tkm	1	t/d	SPM
PWD Passenger	30	Mpkm	0 018	kg/pkm	2	t/d	SPM
PWD Freight	1	Mtkm	0.040	kg/tkm	0	t/d	SPM
NH-Passenger	45	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Freight	209	Mtkm	0.008	kg/tkm	5	t/d	SPM
River Disposal							
					24400	kg/d	TSS
					104000	kg/d	COD
					20	kg/d	BOD
					132000	kg/d	TSS
					71000	kg/d	COD
					5400	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	6000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low elevation discharge
3d	Hld solids		2 kg/hld	12 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0.86 Mt	2.4 kg/t	6 t/d	SPM	Low elevation discharge
	Overburden	3.4 Mm³				
	Underground	3.21 Mt				
	Land damaged due to mining					
	Working Pits			46 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			100 ha	Land	
	Subsided land			541 ha	Land	
	Mine fires			325 ha	Land	
	Abandoned Pits			44 ha	Land	
	Reclaimed land			798 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects			0 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	108600	t	5.4	kg/t	2	t/d	SPM
Softcoke	8100	t	39	kg/t	1	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					16	t/d	SPM
Colliery road	27 55	Mtkm	0.120	kg/tkm	9	t/d	SPM
PWD Passenger	30	Mpkm	0.018	kg/pkm	2	t/d	SPM
PWD Freight	1	Mtkm	0.040	kg/tkm	0	t/d	SPM
NH-Passenger	45	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Freight	209	Mtkm	0.008	kg/tkm	5	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	23000 Units				
	Cookstoves		45 kg/hld	3 t/d	SPM	Low elevation discharge
4a-4b	Hld solids		2 kg/hld	46 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low elevation discharge
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects			0 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	400000	t	5.4	kg/t	6	t/d	SPM
Softcoke	300000	t	39	kg/t	32	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					24	t/d	SPM
Colliery road	0	Mtkm	0.120	kg/tkm	0	t/d	SPM
PWD Passenger	115	Mpkm	0.018	kg/pkm	6	t/d	SPM
PWD Freight	4	Mtkm	0.040	kg/tkm	0	t/d	SPM
NH-Passenger	437	Mpkm	0.004	kg/pkm	4	t/d	SPM
NH-Freight	627	Mtkm	0.008	kg/tkm	14	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	49000 Units				
	Cookstoves		45 kg/hld	6 t/d	SPM	Low elevation discharge
4c	Hld solids		2 kg/hld	98 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	3.54 Mt	2.4 kg/t	23 t/d	SPM	Low elevation discharge
	Overburden	11 9 Mm³				
	Underground	2.25 Mt				
	Land damaged due to mining					
	Working Pits			188 ha	Land	
	Overburden dumps			199 ha	Land	
	Coal dumps			320 ha	Land	
	Subsided land			1354 ha	Land	
	Mine fires			870 ha	Land	
	Abandoned Pits			173 ha	Land	
	Reclaimed land			413 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0.36 Mt				
	Rejects			219 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	103000	t	5.4	kg/t	2	t/d	SPM
Softcoke	22600	t	39	kg/t	2	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					33	t/d	SPM
Colliery road	43.35	Mtkm	0.120	kg/tkm	14	t/d	SPM
PWD Passenger	245	Mpkm	0.018	kg/pkm	12	t/d	SPM
PWD Freight	10	Mtkm	0.040	kg/tkm	1	t/d	SPM
NH-Passenger	45	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Freight	209	Mtkm	0.008	kg/tkm	5	t/d	SPM
River Disposal							
					80	kg/d	TSS
					130	kg/d	COD
					30	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

PRESENT (1990-92)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	11000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low elevation discharge
4d	Hld solids		2 kg/hld	22 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	1.86 Mt	2.4 kg/t	12 t/d	SPM	Low elevation discharge
	Overburden	4 2 Mm³				
	Underground	0.71 Mt				
	Land damaged due to mining					
	Working Pits			99 ha	Land	
	Overburden dumps			57 ha	Land	
	Coal dumps			247 ha	Land	
	Subsided land			166 ha	Land	
	Mine fires			87 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			346 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects			0 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	19300	t	39	kg/t	2	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					7	t/d	SPM
Colliery road	12.85	Mtkm	0.120	kg/tkm	4	t/d	SPM
PWD Passenger	55	Mpkm	0 018	kg/pkm	3	t/d	SPM
PWD Freight	2	Mtkm	0.040	kg/tkm	0	t/d	SPM
NH-Passenger	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Freight	1	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	23000 Units				
	Cookstoves		45 kg/hld	3 t/d	SPM	Low elevation discharge
	Hld solids		2 kg/hld	46 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low elevation discharge
	Overburden	0 Mm^3				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects			0 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					10	t/d	SPM
Colliery road	0	Mtkm	0.120	kg/tkm	0	t/d	SPM
PWD Passenger	115	Mpkm	0.018	kg/pkm	6	t/d	SPM
PWD Freight	4	Mtkm	0.040	kg/tkm	0	t/d	SPM
NH-Passenger	155	Mpkm	0.004	kg/pkm	2	t/d	SPM
NH-Freight	111	Mtkm	0.008	kg/tkm	2	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

Cell	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
	HOUSEHOLDS	85000 Units				
	Cookstoves		45 kg/hld	10 t/d	SPM	Low elevation discharge
6	Hld solids		2 kg/hld	170 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low elevation discharge
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects			0 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	4000000	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					27	t/d	SPM
Colliery road	0	Mtkm	0.120	kg/tkm	0	t/d	SPM
PWD Passenger	425	Mpkm	0.018	kg/pkm	21	t/d	SPM
PWD Freight	18	Mtkm	0 040	kg/tkm	2	t/d	SPM
NH-Passenger	155	Mpkm	0.004	kg/pkm	2	t/d	SPM
NH-Freight	111	Mtkm	0.008	kg/tkm	2	t/d	SPM
River Disposal							
					437000	kg/d	TSS
					63000	kg/d	COD
					900	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	23000 Units				
	Cookstoves		45 kg/hld	3 t/d	SPM	Low elevation discharge
	Hld solids		2 kg/hld	46 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low elevation discharge
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects			0 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					16	t/d	SPM
Colliery road	0	Mtkm	0.120	kg/tkm	0	t/d	SPM
PWD Passenger	115	Mpkm	0.018	kg/pkm	6	t/d	SPM
PWD Freight	4	Mtkm	0.040	kg/tkm	0	t/d	SPM
NH-Passenger	90	Mpkm	0 004	kg/pkm	1	t/d	SPM
NH-Freight	418	Mtkm	0 008	kg/tkm	9	t/d	SPM
River Disposal							
					340000	kg/d	TSS
					115000	kg/d	COD
					3060	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	49000 Units				
	Cookstoves		45 kg/hld	6 t/d	SPM	Low elevation discharge
	Hld solids		2 kg/hld	98 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	1.62 Mt	2.4 kg/t	11 t/d	SPM	Low elevation discharge
	Overburden	4 Mm³				
	Underground	2 3 Mt				
	Land damaged due to mining					
	Working Pits			86 ha	Land	
	Overburden dumps			50 ha	Land	
	Coal dumps			74 ha	Land	
	Subsided land			373 ha	Land	
	Mine fires			207 ha	Land	
	Abandoned Pits			89 ha	Land	
	Reclaimed land			343 ha		
	RIVER MINING					
	Sand	1.1 Mt		1 Mt	Sand	
	COAL WASHERIES	4.17 Mt				
	Rejects			1562 t/d	SW	Washery rejects
	Reject spills			390 t/d	LW	rejects slurry
	Coal spills			114 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	89 8 GWh	0.10 kg/kWh	25 t/d	SPM	High elevation discharge
	Flyash trapped			208 t/d	SW	Converted to LW
	Bottom ash			58 t/d	SW	Converted to LW
	Ash spills			13 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	46000	t	5.4	kg/t	1	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					26	t/d	SPM
Colliery road	37.6	Mtkm	0.120	kg/tkm	12	t/d	SPM
PWD Passenger	245	Mpkm	0.018	kg/pkm	12	t/d	SPM
PWD Freight	10	Mtkm	0.040	kg/tkm	1	t/d	SPM
NH-Passenger	0	Mpkm	0 004	kg/pkm	0	t/d	SPM
NH-Freight	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					722000	kg/d	TSS
					124000	kg/d	COD
					2400	kg/d	BOD
					10700	kg/d	TSS
					3400	kg/d	COD
					500	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2 5 contd.

	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	49000 Units				
	Cookstoves		45 kg/hld	6 t/d	SPM	Low elevation discharge
	Hld solids		2 kg/hld	98 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low elevation discharge
	Overburden	0 Mm³				
	Underground	0.5 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha		
	RIVER MINING					
	Sand	2 Mt		2 Mt	Sand	
	COAL WASHERIES	2 6 Mt				
	Rejects			2247 t/d	SW	Washery rejects
	Reject spills			225 t/d	LW	rejects slurry
	Coal spills			71 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	194 GWh	0 09 kg/kWh	48 t/d	SPM	High elevation discharge
	Flyash trapped			258 t/d	SW	Converted to LW
	Bottom ash			77 t/d	SW	Converted to LW
	Ash spills			33 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	300000	t					
Explosive factory	0	t					
Hard coke	0	t	5 4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements-total					17	t/d	SPM
Colliery road	11 5	Mtkm	0.120	kg/tkm	4	t/d	SPM
PWD Passenger	245	Mpkm	0.018	kg/pkm	12	t/d	SPM
PWD Freight	10	Mtkm	0 040	kg/tkm	1	t/d	SPM
NH-Passenger	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Freight	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal	·						
					607000	kg/d	TSS
					142000	kg/d	COD
					10200	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 2.5 contd.

	Activity	Level of Activity	PRESENT (1990-92) Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	12000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low elevation discharge
ic-8d	Hld solids		2 kg/hld	24 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low elevation discharge
	Overburden	0 Mm^3				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha		
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects			0 t/d	SW	Washery rejects
	Reject spills			0 t/d	LW	rejects slurry
	Coal spills			0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0.00 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	0 t	5.4 kg/t	0 t/d	SPM
Softcoke	0 t	39 kg/t	0 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements-total			3 t/d	SPM
Colliery road	0 Mtkm	0.120 kg/tkm	0 t/d	SPM
PWD Passenger	60 Mpkm	0.018 kg/pkm	3 t/d	SPM
PWD Freight	0 Mtkm	0.040 kg/tkm	0 t/d	SPM
NH-Passenger	0 Mpkm	0 004 kg/pkm	0 t/d	SPM
NH-Freight	0 Mtkm	0.008 kg/tkm	0 t/d	SPM
River Disposal				
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

xure 2.6 List of tributaries and nallas with their origins and confluence points with Damodar river and sources of pollution

Name of the Tributaries/Nallas	Origin Points	Meeting Point	Dischargeable point sources in Tributaries/Nallas
Korr.ar river	Konar Das HZB. Dt.	Bokaro river near BTPS	1. M/s ICI India Ltd., Gonia
Bokaro river	(HZB. DT)	River Damodar at Jarangdih	1. M/s. BTPs
Jamunia river		River Damodar	1. Block II Area collieries of BCCL 2. Other natural drain
Khudia river		Katri river	1. Barore Area collieries of CCL
Katri river	Parasnath (HZB DT.)	River Damodar near Karitand Jetangabad	1. Kustore Area collieries 2. Salnpur and Saslitand collieries of katras Area 3. Other natural drain
Jarian nalla	Gareria	Katri River near Lakarkhawari	1. Jamadoba power house no. 2 2. Tata Sijua group of colliery 3. Other natural drain
Ekra nalla	Upper side of Bhuli (open scrup)	Jarian Nalla Near Gareria	1. Pootki gopalichak and Kenuadih collieries 2. Basuria and East-Basuria collieries of 3. Loyaad, Basudeopur Sendra ansjore & Tetulsari collieries of sujia area of BCCL. 4. Loyabad coke oven plant. 5. Other natural drain
Kari Jore	Bishunpur (upper side of polytechnic dhn.	River Damodar at Jamadoba	1. Dalhari, Propalichak, Kenuadih and Bhagadandh collieries of P.D. Area of BCCL. 2. Kustore area collieries. 3. Industry Bodhar, Gondudih Dhansar (O.P.C.) and Khas Kushunda collieries of kushunda area. 4. Jamadoba coal washery and Jamadoba power house no. 3. 5. Other natural drains.
Domohani river (Chatkari nalla) Chasnalla	Upper side of pathardih from Lodna, Bastakola and Kanhkuyia Area	River Damodar at Chasnalla	1. Lodna coke even plant. 2. Bera colliery, Ghanoodih colliery of Bastakola area 3. Lodna colliery and Jay Rampur colliery of lodna area. 4. Other natural drains. 5. Bararee and Jelgore colliery of Bhowra Area
Kandra nalla	Pathardih Side	River Damodar	1. Patherdih coal washery

Annexure 2.6 contd.

No.	Name of the Tributaries/Nallas	Origin Points	Meeting Point	Dischargeable point sources in Tributaries/Nallas
11.	Sirsakuri nalla	Sindri	River Damodar	1. FCI Sindri 2. P & D Catalyst plant 3. Sindri township discharge.
12.	Khudia Nadi	-	Barakar at Chas (Chirkund)	
13.	Gara river	Garga Das	River Damodar	1. Bokaro and chas. township
14.	Barakar	Tilaya dam	River Damodar in D/S of Punchel	
15.	Dugada nalla	Dugoha	River Damodar	Dugda Township
16.	Goda nalla	Bereo No 4	River Damodar at Jasidih	1. Township discharge and mines water of Berao nc. 4 Jasidih Basti
17.	Phusro nalla	Phusro	River Damodar	1. Phusro township

Annexure 2.7 Industrial effluent characteristics from coal washeries

Description	Flow m^3/sec	BOD mg/l	DO mg/l	TDS mg/l	TSS mg/l	TSS ton/day	COD mg/l
Moonidih	0.11	1.8	-	468	152	1.4	156
Jamadoba	-	2.5	5.6	406	78		25
Sudamdih	-	0.8	9.6	124	56		11
Chasnala	0.12	4.0	-	758	2494	26.0	1112
Kargali	-	1.8	6.6	1090	289		440
Kathara	0.02	0.5	7.5	272	86	0.2	24
Patherdih	0.09	15.0	-	634	36	0.3	424

Annexure 2.8 Industrial effluent treatment facilities available

Status of Pollution Control Measures Adopted by industries in the Damodar Basin

No. Industry	Type of Treatment	Adequacy of Treatment	Major Pollutants	Receiving body of Wastewater	Impact on the River
1. Kargali washery	Settling tanks adopted. Recirculation of final effluent. Presently no discharge to river Damodar	Treatment is not satisfactory	SS, COD	River Damodar	Insignificant
2. Sawang washery	Settling tanks. Final effluent to an abandoned quarry	Treatment is satisfactory	SS, COD	Surface water body	Insignificant
3. CTPS	Settling ponds exist	Inadequate	SS, COD	River Damodar	Significant
4. Dugdha I & II washeries	Settling ponds adopted closed circuit system	Treatment is satisfactory	SS, COD	River Damodar	Insignificant
5. Kathara washery	5 Settling ponds have been provided for the recovery of coal fines	Inadequate	SS, COD	River Damodar through river Konar	Significant
6. BTPS A & B	Wastewater from demineraliser plant is neutralised in reinforced concrete lined pit. Thermal power cooling tower blow down water, floor washing and condenser blow down water is used for ash slurry. Fly ash slurry is discharged into flyash pond	Effluent treatment plant is not effective	SS, COD	River Damodar through river Konar	Significant
7. Mahuda Washery	True floc is added in the thickner for better solid recovery. The effluent is recycled and therefore system acts as a closed circuit	Needs proper operation	SS, COD	River Damodar	Insignificant

Annexure 2.8 contd.

No.	Industry	Type of Treatment	Adequacy of Treatment	Major Pollutants	Receiving body of Wastewater	Impact on the River
8.	Moonidih Washery Station	The effluent is discharged into 8 settling ponds in series. The effluent from settling tanks is discharged into cultivated land. The runoff from the land reaches river Damodar.	Inadequate	SS, COD	River Damodar through cultivated fields	Significant
9.	Jamadoba washery	Installed centrifugal and settling ponds. Effluent recycled	Treatment adequate	SS, COD	River Damodar	Insignificant
10.	Jamadoba Power House No. 1	Settling ponds are constructed for fly ash control	Treatment facilities needs improvement	SS, COD	River Damodar through Joria Nullah	Insignificant
11.	Jamadoba Power House No. 3	No treatment provided. Water finds its way to river Damodar through natural drain	Treatment is inadequate	SS, COD	River Damodar through Dogri Nullah	Significant
12.	Loyabad Coke Oven Plant	Settling tanks	Inadequate	SS, COD	River Damodar through Katri Nullah	Significant
13.	Patherdih washery	The effluent is discharged through settling tanks on the lands	Adequate	SS, COD, Oil & grease	River Damodar	Insignificant
14.	Sudamdih washery	Pucca/kutcha settling tanks, it proposes effluent recirculation	Inadequate	SS, COD, Oil & grease	River Damodar	Insignificant
15.	Chasnala washery	Settling tanks. Effluent recirculated. A portion goes out as seepage	Inadequate	SS, COD, Oil & grease	River Damodar	Insignificant
16.	Bhowra Coke Plant	No treatment at present. Settling tanks under construction	Inadequate	SS, COD	River Damodar	Significant

Source: Feasibility Report on Pollution Abatement of Damodar River (December 1994), NEERI.

Annexure 2.9 Major Cities/Towns Which Discharge Domestic Wastewater into the River Damodar

No.	City/Town	1991 Census Population	Approximate distance from river Damodar	Source of water supply	Drainage system	Sewage Disposal	Impact on the river	Recommended improvement
1.	Gomia	41295	7 km	Surface and bore well water	Open drainage	No STP. Domestic waste discharged into the river Konar and Bokaro	Insignificant	None
2.	Kathara	17391	1 km	Surface water (conventional treatment)	Open drains	No STP	Insignificant	None
3.	Bokaro	28368	8 km	Surface water through conven- tional treatment system.	Sewerage system installed	Oxidation pond effluent to river Damodar through Konar river	Significant	Implementation of pollution abatement scheme
4.	Jaridih	68556	0.5 km	Damodar river	Open nullahs	Very few septic tanks exist	Insignificant	None
5.	Phusro	70544	1.5 km	Konar river, tube-wells supply	Open nullahs	No STP	Insignificant	None
6.	Bokaro Steel City	333683	19 kms	Tenughat dam Garga	Underground sewer lines	Oxidation pond effluent to river Damodar via Garga river	Insignificant	None
7.	Chas	65207	2 km	The township gets treated water from Bokaro Steel Ltd. for drinking	Nullah draining into river Damodar via Garga river	No STP. One Sulabh Sauchalaya. Individual septic tanks exist	Insignificant	None

Annexure 2.9 contd.

No. City/Town	1991 Census Population	Approximate distance from river Damodar	Source of water supply	Drainage system	Sewage Disposal	Impact on the river	Recommended improvement
8. Chandrapura	19814	About 2 km	Damodar river	Through Pokriah nullah	STP installed. Effluent discharged through Pokriah nullah	Insignificant	None
9. Dugdha	15209	4 km	Water supply system exists for colony and water intake from river Damodar	Open drain	Drained into river Damodar	Significant	Implementation of pollution abatement scheme
10. Jharia	69641	10 km	River Damodar	Open nullah	Open defecation. Very few septic tank	Significant	Implementation of pollution abatement scheme
11. Jamadoba	31761	3 km	Tube well and hand pump	Open drains	Sulabh Sauchalaya. Dumping in an underground tank.	Significant	Implementation of pollution abatement scheme
12. Sudamdih	18000	3 km	Surface water (Conventional treatment)	Open drains	Septic tanks	Significant	Implementation of pollution abatement scheme
13. Patherdih	27319	5 km	Surface water (Conventional treatment)	Open drains	Drained into the river	Insignificant	Implementation of pollution abatement scheme
14. Sindri	72333	3 km	Surface water (Conventional treatment)	Underground sewer lines installed	A septic tank for combined effluent is provided. Treated sewage is used for irrigation	Insignificant	Construction of one wood based crematorium

Source: Feasibility Report on Pollution Abatement of Damodar River (December 1994), NEERI.

Annexure 2.10 Details of fire projects in the JCF

No.	Name of project	Name of file	Activities as per P R	Area (sq km.)	Habitate affected		Remarks/Status
1	Phulantand	- Ganeshpur - Barwabara - Phulantand	- Surface sealing - Fly Ash flushing	0.50	Nil	Nil	Dozing & blanketting has been done and will be followed by multi capping 0.30 mt. Coal has been recovered (as per PR provision). Drilling of bore holes for mud-flushing and monitoring going on. Fire controlled partially.
2	Angarpathra	- Angarpathra	- Trench cutting - Surface sealing - Water flushing	0.20	29	166	Trenching & digging of fire carried out. Sealing operation at the surface also done over a large part of the affected area.50% number of bore holes completed for water infusion. Additionally Nitrogen infusion carried out. Fire largely under control.
3	Gaslitand	- Gaslitand fire	- Quarry filling with O B - Surface sealing & compaction	0.86			- Dozing & compaction work carried out over the area - Surface sealing with mutti completed over half of the area. Fire generally under control.
4	Jogta (controlled)		- Surface sealing - Flyash flushing	0.18			- Blanketting completed - Surface sealing (compaction) operations completed - 0.37 mt. of coal recovered - Plantation carried out over the compacted area done. Deer park developed. Fire controlled.
5	Kankanee	- Kankanee fire	- Surface sealing - UG sealing	0.41	136	544	- Quarry filling with OBR completed over 80% area - Surface sealing completed partially - UG area completed sealed-off. Fire generally under control.
6	Ekra North	- Ekra fire XIII/XIV - Ekra fire XI/XII	- Surface dozing - Blanketting with mutti	0.055	Nil	Nil	- Blanketting with mutti partially completed - Surface dozing completed over 50% area. Fire partially under control.
7	Ekra Jore stabalisation & fire	- Loyabad - Bussuriya - Sendra Bansjora - Bansdeopur - Gopalichuck	- Surface sealing - Sand flushing - Cement injection - Jore stabilisation	1.8	200	1000	- Blanketting with multi completed - 10% - Sand flushing completed 30% - Cement/Bentonite injection completed partially - All drill holes almost completed - Retaining wall construction completed. Fire partially controlled
8	Industry Kusunda	- Kusunda - Industry	- Surface sealing - Jore bed grouting	1.2	55	220	- Blanketting with OBR completed (70%) - Blanketting with mutti completed (20%) - Drill holes for grouting completed - Grouting operations completed. Fire partially controlled
9	Alkusa	- Alkusa fire	- Digging out with coal recovery - Surface sealing	0.1			- Digging out operations going on - Blanketting completed - 90%. Fire generally under control

Annexure 2.10 contd.

No.	Name of project	Name of file	Activities as per P R	Area (sq.km.)	Habitate affected		Remarks/Status
10	Kustora	- Kustora fire	- Digging with coal recovery - OB removal - Surface sealing	0.1			- Over burden removal exceeded the target - Fire dug out partially - Surface blanketting with OBR continuing - Coal recovered to the target - Embankment near jore constructed. Fire partially controlled
11	Ena	- Ena fire	- Digging and coal recovery	0.41			- Overburden removal activities followed by coal removal, going on - OB removal almost 50%. Fire partially active
12	Rajapur (1 fire controlled)	- Pure Jharia - KP Dobari	- Trench cutting - Coal recovery	0.25	H9	500	- Trench cutting almost completed - Coal recovery completed to the target. Fires generally controlled
13	Kujama	- Kujama IX/XII - Kujama IX/X	- Surface sealing - Construction of UG stoppings	0.80	966	4000	- Dozing and blanketing of fire area completed partially - Isolation stoppings completed below ground - Tree plantation carried out. Fire partially controlled
14	Bhalgora	- Bhalgora XV - Bhalgora XIV - East Bhagatdih XIV/XV - Ena XV - Ena XIV - Simiabahal XIV/XV	- Surface sealing - UG stoppings - Sand flushing - Inert gas infusion - Flyash flushing	1.4	900	4000	- Sealing completed partly - Drilling of holes for sand mutti flushing almost completed - Sand flushing around goaf edges completed 70% - UG stoppings completed - Dozing completed partly - Tree plantation carried out. Fires controlled partially
15	Lodna	- NS Lodna - Bagdigih - Beniahir - Bhaga	- Trench cutting - Flyash flushing - Surface sealing	2.1	4250	17000	- Trench cutting completed 50% don - Blanketting with mutti 30% don - Surface dozing completed 40% don - Sand stowing below surface structures 60% don - Nitrogen flushing being done. Fires partially controlled.
16	South Tisra	- South Tisra	- Surface sealing - Inert gas injection - UG sand barrier	0.48	180	720	- Sealing with OBR completed partially - Sand stowing operations commenced - Foam/N_2 injection tried limited success - Coal recovered - Isolation stopping against sand barrier completed - New scheme under S&T to be tried. Fire partially controlled
17	Bhowra	- Bhowra fire	- Surface sealing	0.64			- Blanketting with OB started which will be followed by blanketting with mutti. Fire partially controlled
18	Bararee	- Bararee fire	- Digging - Surface sealing	0.5	458	2735	- OBR 70% completed - Quarry filling and surface sealing completed 30% - Dozing and compaction operations completed 40%. Fire partially controlled
19	Bhulan Bararee	- Bhulan Bararee XIII/XIV - Bhulan Bararee XV	- Digging	0.3	50	300	- Fire dealing operations carried out by Bararee colliery. Blanketting with mutti already started. Fire partially controlled

No.	Name of project	Name of file	Activities as per P R	Area (sq.km.)	Habitate affected		Remarks/Status
20	Sudamdih-Patherdih	- Sudamdih IX-XIV - Patherdih IX-XII - Bhowra IX-X	- Surface sealing - Stabilisation of UG workings	0.63	236	1400	- Filling of quarry by OBR completed 70% - OB removed - 5.0 mm3 from Damodar OCP fire - Coal recovered 1.00 mt. Fire partially controlled
21	11 fires in 7 collieries (1 controlled	- Block II-X to XIII - Katras Choitudih XIII - Katras Choitudih XIV//XV - Tetulmari IV - Tetulmari VII/VIII - Kendwadih XIII - Kendwadih XIII/XIV - East Bussuriya V/VI - East Bussuriya VIII - Kessurgarh	- Digging out slurry packing - Surface sealing - Underground sealing - N_2 fusion				- Fire being dug out at Block II presently - Ash slurry being packed in UG workings - Surface sealing and dozing operations being done - Stowing through Boreholes completed - Trench cutting carried out wherever necessary. Fire partially controlled
22	6 Fires (1 group) (3 controlled)	- Balihari Bhagaband - Damuda - Mudidih	- Construction of stoppings - Treatment of stoppings with thermogeals - Installation N_2 Plant - Blanketting with mutti - OB removal				- OB removal completed 70% - Blanketting carried at 50% - N_2 plant under installation at Amlabad - Stoppings constructed and sealing carried out
23	Mukunda commoned area	- North Tisra X T/B - North Tisra IX/VIII/VII - Jeanagora/Joyrampur IX/XIII - Jeanagora/Joyrampur IX/XIII - Jeanogora/Joyrampur A - Jeanogora XV	- Blanketing - Dozing - Strengthening of isolation stoppings - N_2 fusion - Surface sealing - Stabilisation of jore bed - Sand flushing				- Protective measures taken, such as sand flushing through bore holes to check the advance of fire stabilisation activities being processed
	Total 59 fires						

Annexure 2.11 Present conditions (circa 1991) - number of households exposed to various concentrations of air pollution (spatial distribution)

Cell group	SPM concentration ($\mu g/m^3$)			
	< 200	200 ≤ 350	350 ≤ 500	> 500
1a-1b	5000	6000	0	0
1c	14000	26000	0	0
1d	0	35000	5000	0
2a-2b	1500	7000	2500	0
2c	0	4000	36000	0
2d	0	0	6000	0
3a	0	0	4500	1500
3b	0	0	6000	0
3c	0	0	1000	5000
3d	0	0	2000	4000
4a-4b	0	0	21000	2000
4c	0	0	4000	45000
4d	2000	5000	4000	0
5	7000	16000	0	0
6	5000	20000	60000	0
7	2000	12000	9000	0
8a	0	20000	27000	2000
8b	3000	24000	12000	10000
8c-8d	4000	8000	0	0

Annexure 2.12 Present condition (circa 1991) - estimated sectoral shares of suspended particulate matter (SPM) contribution to ambient air quality

Cell	Annual average ambient concentration ($\mu g/m^3$)	Coal mining	Percentage contribution of SPM to ambient air quality			Other
			Household cooking	Truck traffic	Power stations	
1a-1b	225	0	22	66	12	0
1c	225	46	11	36	5	2
1d	325	41	13	41	5	0
2a-2b	275	0	23	70	7	0
2c	375	45	7	26	4	18
2d	425	0	31	63	6	0
3a	500	71	2	22	3	2
3b	450	62	4	31	3	0
3c	525	0	10	82	8	0
3d	525	23	4	63	2	8
4a-4b	350	0	5	36	2	57
4c	600	34	9	50	1	6
4d	325	54	5	31	1	9
5	250	0	21	71	8	0
6	275	0	26	69	5	0
7	350	0	15	78	7	0
8a	375	24	13	58	3	2
8b	350	0	27	72	1	0
8c-8d	225	0	23	69	8	0

Annexure 3.1 Alternative stowing materials

a) **Crushed over-burden stones**

Though widely used as dry fill as well as hydraulic fill in many parts of the world; crushed stones have found only limited applications in our mines. CMRS had carried out a pilot scale industrial trial on borehole stowing with crushed stones in BCCL. In this trial, an effective method of mixing sand, crushed stone and water has been evolved. Rates of stowing of nearly 150 t/h could be achieved using 50 mm crushed rocks at L/H of nearly 7. Compressibility of crushed overburden rocks is more than that of river sand and hence their utilization for hydraulic stowing will depend upon the category of surface protection required, thickness of coal seams, depth of mines, etc. Their compressibility, however, has been found to decrease with addition of river sand. Fly ash addition with crushed rocks act as a lubricant during hydraulic transportation in pipes and head losses are comparable to that with coarse sand.

b) **Washery rejects**

There are 11 washeries operating in JCF and they generate about 1.8 Mt of washery rejects per annum. The washery rejects are generally dumped the surface near the washeries and occupy areas of land. In 1984, CMRS had carried out laboratory tests and actual use in mines and these showed that washery rejects upto the size of 30 mm could be used as stowing material. During 1990-91, Chasnalla washery rejects in the size range of 0-20 mm was mixed with sand upto 30 percent and stowed in the underground mine of Jitpur colliery. During 1991-92, in the same mine 100 percent washery rejects was successfully stowed and an amount of 30,000 t was stowed from August 1991 to June 1992. According to Chasnalla authorities, based on the experience at Jitpur colliery washery, rejects within the size range of 0-20 mm can be successfully stowed underground provided flow parameters are properly studied and adjusted. Pipe layout is to be constantly studied to avoid cavitation and pulsatory flows in pipes. The ash content in these rejects is above 70 percent. Therefore washery reject is a suitable material for hydraulic stowing because its maximum size is restricted to 25 mm, its water percolation rate is higher than the minimum acceptable limit and is lighter than sand.

c) **Bottom ash from boilers**

Based on the laboratory results, it has been observed that bottom ash from thermal power plants, fertilizer plants, and colliery steam boilers can be used for hydraulic stowing purpose, provided the following steps are taken

1 The clinkers (larger than 50 mm) in ash are either screened off at the site prior to transporting them to the storage bunker, or, they are crushed to sizes below 50 mm. If crushing is restored to, single-stage crushing may serve the purpose because their strength is not very high.

2 Bottom ash should not be used alone for underground stowage because compressibility is very high (5-7 times that of sand) and there is a likelihood of affinity towards spontaneous heating. A 50:50 mixture of ash and sand by volume in this respect may prove safe from auto-oxidation point of view and such mixtures could be utilized for filling voids of thin seams lying at great depths.

3 If surface features are to be protected, the proportion of ash should not exceed 15-25 percent depending upon the category of protection.

4 The success of a scheme of hydraulic stowing with a mixture of ash and sand shall depend largely on the efficiency of ensuring correct proportions of ash and sand in preparing a mixture as well as their intimate mixing. This could be achieved if separate storage of ash and sand in the bunkers is ensured and they are allowed to mix in a properly designed mixing trough.

5 The ash bunker may have to be specially designed with side slopes made steeper than what is made for sand bunkers to avoid sticking of the material.

d) **Fly ash from TPS**

CMRS, based on results of laboratory studies carried out by them, have suggested as follows:

1 A mixture of fly ash and sand shows a little higher compressibility and lower water percolation rate than a mixture of bottom ash and sand. A mixture of 70 percent sand and 20 percent bottom ash and 10 percent fly ash could be an optimum mixture for hydraulic stowing.

2 Fly ash can be used in small percentages (5-10 percent) for decreasing the frictional resistance during hydraulic transportation of coarse sand or crushed stone in pipelines.

3 Fly ash has a cementing effect. Investigations have shown that with lapse of time, the sand fly ash mixture with a small amount of cement stowed in goaves should build up considerable strengths. This property of fly ash could be used for strengthening the pack.

Annexure 3.2 Modernization scheme implemented after 1991/ under implementation

Washery	Particulars
Bhojudih	i) Installation of new tippler for handling all types of raw coal wagons. ii) Installation of deshaling plant. iii) Installation of froth flotation circuit for upgradation of fine coal. iv) Installation of new jig.
Dugda-I	i) Installation of deshaling plant. ii) Installation of rock breaker. iii) Installation of new 1000 t surge bunker. iv) Installation of thickener under-flow pumps. v) Increasing capacity of clean coal and middling bunkers. vi) Installation of ball mill.
Dugda-II	Installation of deshaling plant.
Sudamdih	Installation of deshaling plant.
Kargali	i) Installation of deshaling plant ii) Installation of froth flotation for upgradation of fine coal iii) Replacement of crusher iv) Replacement of HM drum washer by modern jig
Kathara	i) Replacement of screens ii) Installation of solid bowl centrifuge for tailings dewatering iii) Replacement of flotation cells and screen bowl centrifuge iv) Replacement of existing foxboro control system with PLC based control system
Patherdih	i) Complete modernisation
Automation of washeries	

Annexure 3.3 New roads planned and under construction in HIRAK project

No.	Name of road		Length (km)	Cost (Rs million)
1.	a)	Saraidhela-Patheridih Phase-I & II (new align)	13.050	106.37
	b)	Saraidhela-Patheridih Phase-III (new align)	9.735	74.25
2	a)	Sindri-Lohapatti ring road phase-I (new align)	8.190	50.09
	b)	Sindri-Lohapatti ring road phase-II (new align)		
			14.215	99.79
3.	Jharia Housing complex (new alignment)		0.950	5.23
4.	Amlabad-Mahulbanighat (new align)		4.450	32.40
5.	Mahulbanighat 'T' Jn. D.B. Road (resurf)		3.375	2.40
6.	Link Road: Dumra-Chandrapura-Lohapatti-Chandrapura		4.020	19.94
	Total		57.985	390.47

circa 2001

Annual population growth rate	2.1	%
Annual highway pkm growth rate (PASSENGE	2	%
Annual highway tkm growth rate (FREIGHT)	2	%

CELL #		1a-1b	1c	1d	2a-2b	2c	2d	3a	3b	3c	3d	4a-4b	4c	4d	5	6	7	8a	8b	8c-8d
HOUSEHOLDS	Units	14000	49000	49000	14000	49000	7000	7000	7000	7000	7000	28000	60000	14000	28000	105000	28000	60000	60000	15000
COAL MINING																				
Open Cast	Mt	0	2.5	3	0	4.5	0	8.2	3.2	0	1.2	0	2.4	0.4	0	0	0	0.1	0	0
Overburden	Mm³	0	10.8	7.3	0	7	0	15.5	4.1	0	3.4	0	5.9	0.7	0	0	0	0	0	0
Underground	Mt	0	0.5	0.5	0	0.2	0	0.3	2.5	0.4	4.5	0	2.5	0.6	0	0	0	3.1	0.5	0
Land damaged due to mining																				
Working Pits	ha	0	100	120	0	180	0	328	128	0	48	0	96	16	0	0	0	4	0	0
Overburden dumps	ha	0	43	29	0	28	0	62	16	0	14	0	24	3	0	0	0	0	0	0
Coal dumps	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subsided land	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine fires	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abandoned Pits	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reclaimed land	ha	0	300	300	0	300	0	500	0	0	300	0	1100	300	0	0	0	500	0	0
RIVER MINING																				
Sand	Mt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	1.3	0
RAW COAL FEED WASHERIES	Mt	0	3.4	2.4	0	0	0	2.8	0	0	0.72	0	0.4	0	0	0	0	5.91	3.11	0
Rejects	Mt	0.00	0.63	0.44	0.00	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.81	0.98	0.00
Reject spills	%	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0
Coal spills	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POWER PLANTS																				
PP-1 Activity	GWh	0	832	0	0	0	3416	140	0	0	0	0	0	0	0	0	0	175	266	0
PP-1 Dis factor	kg/kWh	0	0.02	0	0	0	0.02	0.05	0	0	0	0	0	0	0	0	0	0.05	0.03	0
PP-1 Ash factor	kg/kWh	0	0.28	0	0	0	0.29	1.07	0	0	0	0	0	0	0	0	0	0.9	0.4	0
PP-1 Ash Spills	%	0	10	0	0	0	50	5	0	0	0	0	0	0	0	0	0	5	10	0
PP-2 Activity	GWh	0	3311	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	70	0
PP-2 Dis factor	kg/kWh	0	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	0
PP-2 Ash factor	kg/kWh	0	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.07	1.07	0
PP-2 Ash Spills	%	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0

Annexure 3.4 contd.

CELL #		1a-1b	1c	1d	2a-2b	2c	2d	3a	3b	3c	3d	4a-4b	4c	4d	5	6	7	8a	8b	8c-8d
PP-3 Activity	GWh	0	140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	0	0
PP-3 Dis factor	kg/kWh	0	0 05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 05	0	0
PP-3 Ash factor	kg/kWh	0	1.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 07	0	0
PP-3 Ash Spills	%	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0
OTHER INDUSTRIES																				
Steel Plant	t	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4000000	0	0	0	0
Fertilizer Plant	t	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	300000	0
Explosive factory	t	0	40000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hard coke	t	0	0	0	0	0	0	4300	18000	0	108600	400000	103000	0	0	0	0	46000	0	0
Softcoke	t	0	9000	0	0	133000	0	6500	0	0	8100	300000	22600	19300	0	0	0	0	0	0
TRANSPORT																				
Rail movements		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Road movements																				
Sand movement	Mtkm	0	0	0	0	0	0	0	0	0	5	0	10	0	0	0	0	12	6	0
NH-2, NH-32, NH-23, & other traffic																				
Passenger	Mpkm	0	0	0	0	0	0	0	0	55	55	533	55	0	189	189	110	0	0	0
Freight	Mtkm	0	0	0	0	0	0	0	0	255	255	764	255	1	135	135	510	0	0	0
Other Freight	Mtkm	2	10	10	2	10	1	1	1	1	1	5	12	2	5	22	5	12	12	0
Coll roads	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PWD roads	%	0	50	50	0	50	50	0	30	50	30	0	50	30	0	0	0	50	50	0
River Disposal																				
1	TSS	0	554260	7194286	0	1291900	2609669	0	0	156400	0	0	80	0	0	437000	340000	398237	564565	0

Note Projections for this scenario are based on Annexure 2 4 and Planned Improvements envisaged by industry and government

Annexure 3.5 Future conditions (circa 2001) - Management Strategy I (Planned Improvements) - basic data and residual generation - cell-wise

FUTURE-1

Cell -1b

Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
HOUSEHOLDS	14000 Units				
Cookstoves		45 kg/hld	2 t/d	SPM	Low Elevation Discharge
Hld solids		2 kg/hld	28 t/d	SW	Household solid waste
COAL MINING					
Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low Elevation Discharge
Overburden	0 Mm^3				
Underground	0 Mt				
Land damaged due to mining					
Working Pits			0 ha	Land	
Overburden dumps			0 ha	Land	
Coal dumps			0 ha	Land	
Subsided land			0 ha	Land	
Mine fires			0 ha	Land	
Abandoned Pits			0 ha	Land	
Reclaimed land			0 ha	Land	
RIVER MINING					
Sand	0 Mt		0 Mt	Sand	
COAL WASHERIES	0 Mt				
Rejects	0.0 Mt		0 t/d	SW	Washery rejects
Reject spills	0 %		0 t/d	LW	rejects slurry
Coal spills	0 %		0 t/d	LW	coalfines slurry
POWER PLANTS					
PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	0 t	5.4 kg/t	0 t/d	SPM
Softcoke	0 t	39 kg/t	0 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			4 t/d	SPM
Colliery roads	0 Mtkm	0.12 kg/tkm	0 t/d	SPM
PWD pas	70 Mpkm	0.02 kg/pkm	4 t/d	SPM
PWD Fht	2 Mtkm	0.04 kg/tkm	0 t/d	SPM
NH-Pas	0 Mpkm	0.004 kg/pkm	0 t/d	SPM
NH-Fht	0 Mtkm	0.008 kg/tkm	0 t/d	SPM
River Disposal				
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

Annexure 3.5 contd.

FUTURE-1

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	14000 Units				
	Cookstoves		45 kg/hld	2 t/d	SPM	Low Elevation Discharge
la-2b	Hld solids		2 kg/hld	28 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low Elevation Discharge
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0.4 Mt		0 t/d	SW	Washery rejects
	Reject spills	10 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					4	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/tkm	0	t/d	SPM
PWD pas	70	Mpkm	0.02	kg/pkm	4	t/d	SPM
PWD Fht	2	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

nnexure 3.5 contd.

FUTURE-1

	Activity	Level of Activity		Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS		49000 Units				
	Cookstoves			45 kg/hld	6 t/d	SPM	Low Elevation Discharge
;	Hld solids			2 kg/hld	98 t/d	SW	Household solid waste
	COAL MINING						
	Open Cast		2 5 Mt	2.4 kg/t	16 t/d	SPM	Low Elevation Discharge
	Overburden		10.8 Mm^3				
	Underground	1c	Mt				
	Land damaged due to mining						
	Working Pits				100 ha	Land	
	Overburden dumps				43 ha	Land	
	Coal dumps				0 ha	Land	
	Subsided land				0 ha	Land	
	Mine fires				0 ha	Land	
	Abandoned Pits				0 ha	Land	
	Reclaimed land				300 ha	Land	
	RIVER MINING						
	Sand		0 Mt		0 Mt	Sand	
	COAL WASHERIES		3.4 Mt				
	Rejects		0.6 Mt		1719 t/d	SW	Washery rejects
	Reject spills		10 %		172 t/d	LW	rejects slurry
	Coal spills		0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS						
	PP-1 Emissions		832 GWh	0 02 kg/kWh	46 t/d	SPM	High elevation discharge
	Flyash trapped				465 t/d	SW	Converted to LW
	Bottom ash				128 t/d	SW	Converted to LW
	Ash spills				59 t/d	LW	Ash slurry
	PP-2 Emissions		3311 GWh	0 02 kg/kWh	181 t/d	SPM	High elevation discharge
	Flyash trapped				1633 t/d	SW	Converted to LW
	Bottom ash				454 t/d	SW	Converted to LW
	Ash spills				209 t/d	LW	Ash slurry
	PP-3 Emissions		140 GWh	0.05 kg/kWh	19 t/d	SPM	High elevation discharge
	Flyash trapped				309 t/d	SW	Converted to LW .
	Bottom ash				82 t/d	SW	Converted to LW
	Ash spills				20 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	40000	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	9000	t	39	kg/t	1	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					12	t/d	SPM
Colliery roads	13	Mtkm	0.12	kg/tkm	4	t/d	SPM
PWD pas	245	Mpkm	0.02	kg/pkm	7	t/d	SPM
PWD Fht	10	Mtkm	0 04	kg/tkm	1	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					554260	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

ınexure 3.5 contd.

	Activity	Level of Activity	FUTURE-1 Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	49000 Units				
	Cookstoves		45 kg/hld	6 t/d	SPM	Low Elevation Discharge
	Hld solids		2 kg/hld	98 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	3 Mt	2.4 kg/t	20 t/d	SPM	Low Elevation Discharge
	Overburden	7.3 Mm³				
	Underground	0 5 Mt				
	Land damaged due to mining					
	Working Pits			120 ha	Land	
	Overburden dumps			29 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			300 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	2.4 Mt				
	Rejects	0 4 Mt		1196 t/d	SW	Washery rejects
	Reject spills	10 %		120 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
				0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	0 t	5.4 kg/t	0 t/d	SPM
Softcoke	133000 t	39 kg/t	14 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			16 t/d	SPM
Colliery roads	24 Mtkm	0.12 kg/tkm	8 t/d	SPM
PWD pas	245 Mpkm	0.02 kg/pkm	7 t/d	SPM
PWD Fht	10 Mtkm	0.04 kg/tkm	1 t/d	SPM
NH-Pas	0 Mpkm	0.004 kg/pkm	0 t/d	SPM
NH-Fht	0 Mtkm	0 008 kg/tkm	0 t/d	SPM
River Disposal	.		1291900 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

Annexure 3.5 contd.

FUTURE-1

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	7000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low Elevation Discharge
	Hld solids		2 kg/hld	14 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low Elevation Discharge
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0.0 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	3416 GWh	0.02 kg/kWh	187 t/d	SPM	High elevation discharge
	Flyash trapped			1984 t/d	SW	Converted to LW
	Bottom ash			543 t/d	SW	Converted to LW
	Ash spills			1263 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	0 t	5.4 kg/t	0 t/d	SPM
Softcoke	0 t	39 kg/t	0 t/d	SPM
TRANSPORT				
Rail movements	0		1 t/d	SPM
Road movements (total)			0 t/d	SPM
Colliery roads	0 Mtkm	0 12 kg/tkm	1 t/d	SPM
PWD pas	35 Mpkm	0.02 kg/pkm	0 t/d	SPM
PWD Fht	1 Mtkm	0.04 kg/tkm	0 t/d	SPM
NH-Pas	0 Mpkm	0.004 kg/pkm	0 t/d	SPM
NH-Fht	0 Mtkm	0.008 kg/tkm	0 t/d	SPM
River Disposal			2609669 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

Annexure 3.5 contd.

FUTURE-1

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	7000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low Elevation Discharge
	Hld solids		2 kg/hld	14 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	8.2 Mt	2.4 kg/t	54 t/d	SPM	Low Elevation Discharge
	Overburden	15.5 Mm³				
	Underground	0.3 Mt				
	Land damaged due to mining					
	Working Pits			328 ha	Land	
	Overburden dumps			62 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			500 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	2 8 Mt				
	Rejects	0 9 Mt		2466 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	140 GWh	0.05 kg/kWh	19 t/d	SPM	High elevation discharge
	Flyash trapped			309 t/d	SW	Converted to LW
	Bottom ash			82 t/d	SW	Converted to LW
	Ash spills			20 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	4300 t	5.4 kg/t	0 t/d	SPM
Softcoke	6500 t	39 kg/t	1 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			16 t/d	SPM
Colliery roads	42 Mtkm	0.12 kg/tkm	14 t/d	SPM
PWD pas	35 Mpkm	0.02 kg/pkm	2 t/d	SPM
PWD Fht	1 Mtkm	0.04 kg/tkm	0 t/d	SPM
NH-Pas	0 Mpkm	0.004 kg/pkm	0 t/d	SPM
NH-Fht	0 Mtkm	0.008 kg/tkm	0 t/d	SPM
River Disposal				
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

Annexure 3.5 contd.

	Activity	Level of Activity	FUTURE-1 Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	7000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low Elevation Discharge
	Hld solids		2 kg/hld	14 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	3 2 Mt	2 4 kg/t	21 t/d	SPM	Low Elevation Discharge
	Overburden	4.1 Mm³				
	Underground	2.5 Mt				
	Land damaged due to mining					
	Working Pits			128 ha	Land	
	Overburden dumps			16 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0.0 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	18000 t	5.4 kg/t	0 t/d	SPM
Softcoke	0 t	39 kg/t	0 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			11 t/d	SPM
Colliery roads	29 Mtkm	0.12 kg/tkm	9 t/d	SPM
PWD pas	35 Mpkm	0.02 kg/pkm	1 t/d	SPM
PWD Fht	1 Mtkm	0.04 kg/tkm	0 t/d	SPM
NH-Pas	0 Mpkm	0.004 kg/pkm	0 t/d	SPM
NH-Fht	0 Mtkm	0.008 kg/tkm	0 t/d	SPM
River Disposal				
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			,0 kg/d	BOD

ınexure 3.5 contd.

FUTURE-1

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	7000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low Elevation Discharge
	Hld solids		2 kg/hld	14 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low Elevation Discharge
	Overburden	0 Mm³				
	Underground	0.4 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0 0 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	0 t	5.4 kg/t	0 t/d	SPM
Softcoke	0 t	39 kg/t	0 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			8 t/d	SPM
Colliery roads	2 Mtkm	0.12 kg/tkm	1 t/d	SPM
PWD pas	35 Mpkm	0.02 kg/pkm	1 t/d	SPM
PWD Fht	1 Mtkm	0 04 kg/tkm	0 t/d	SPM
NH-Pas	55 Mpkm	0.004 kg/pkm	1 t/d	SPM
NH-Fht	255 Mtkm	0.008 kg/tkm	6 t/d	SPM
River Disposal				
			156400 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

FUTURE-1

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
;ell	HOUSEHOLDS	7000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low Elevation Discharge
	Hld solids		2 kg/hld	14 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	1.2 Mt	2.4 kg/t	8 t/d	SPM	Low Elevation Discharge
	Overburden	3.4 Mm³				
	Underground	4.5 Mt				
	Land damaged due to mining					
	Working Pits			48 ha	Land	
	Overburden dumps			14 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			300 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0.72 Mt				
	Rejects	0 0 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	108600	t	5.4	kg/t	2	t/d	SPM
Softcoke	8100	t	39	kg/t	1	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					19	t/d	SPM
Colliery roads	33	Mtkm	0.12	kg/tkm	11	t/d	SPM
PWD pas	35	Mpkm	0.02	kg/pkm	1	t/d	SPM
PWD Fht	1	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	55	Mpkm	0.004	kg/pkm	1	t/d	SPM
NH-Fht	255	Mtkm	0.008	kg/tkm	6	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

exure 3.5 contd.

FUTURE-1

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	28000 Units				
	Cookstoves		45 kg/hld	3 t/d	SPM	Low Elevation Discharge
b	Hld solids		2 kg/hld	56 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low Elevation Discharge
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0 0 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	400000 t	5.4 kg/t	6 t/d	SPM
Softcoke	300000 t	39 kg/t	32 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			30 t/d	SPM
Colliery roads	0 Mtkm	0.12 kg/tkm	0 t/d	SPM
PWD pas	140 Mpkm	0.02 kg/pkm	7 t/d	SPM
PWD Fht	5 Mtkm	0.04 kg/tkm	1 t/d	SPM
NH-Pas	533 Mpkm	0 004 kg/pkm	5 t/d	SPM
NH-Fht	764 Mtkm	0 008 kg/tkm	17 t/d	SPM
River Disposal				
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

Annexure 3.5 contd.

FUTURE-1

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	14000 Units				
	Cookstoves		45 kg/hld	2 t/d	SPM	Low Elevation Discharge
	Hld solids		2 kg/hld	28 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0.4 Mt	2 4 kg/t	3 t/d	SPM	Low Elevation Discharge
	Overburden	0.7 Mm³				
	Underground	0.6 Mt				
	Land damaged due to mining					
	Working Pits			16 ha	Land	
	Overburden dumps			3 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			300 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0.0 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	0 t	5.4 kg/t	0 t/d	SPM
Softcoke	19300 t	39 kg/t	2 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			5 t/d	SPM
Colliery roads	5 Mtkm	0.12 kg/tkm	2 t/d	SPM
PWD pas	70 Mpkm	0.02 kg/pkm	3 t/d	SPM
PWD Fht	2 Mtkm	0 04 kg/tkm	0 t/d	SPM
NH-Pas	0 Mpkm	0 004 kg/pkm	0 t/d	SPM
NH-Fht	1 Mtkm	0 008 kg/tkm	0 t/d	SPM
River Disposal			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

FUTURE-1

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	60000 Units				
	Cookstoves		45 kg/hld	7 t/d	SPM	Low Elevation Discharge
	Hld solids		2 kg/hld	120 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	2 4 Mt	2 4 kg/t	16 t/d	SPM	Low Elevation Discharge
	Overburden	5.9 Mm³				
	Underground	2.5 Mt				
	Land damaged due to mining					
	Working Pits			96 ha	Land	
	Overburden dumps			24 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			1100 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0.4 Mt				
	Rejects	0.1 Mt		244 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	103000 t	5.4 kg/t	2 t/d	SPM
Softcoke	22600 t	39 kg/t	2 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			27 t/d	SPM
Colliery roads	34 Mtkm	0.12 kg/tkm	11 t/d	SPM
PWD pas	300 Mpkm	0.02 kg/pkm	9 t/d	SPM
PWD Fht	12 Mtkm	0.04 kg/tkm	1 t/d	SPM
NH-Pas	55 Mpkm	0.004 kg/pkm	1 t/d	SPM
NH-Fht	255 Mtkm	0.008 kg/tkm	6 t/d	SPM
River Disposal			80 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

nexure 3.5 contd.

FUTURE-1

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	28000 Units				
	Cookstoves		45 kg/hld	3 t/d	SPM	Low Elevation Discharge
	Hld solids		2 kg/hld	56 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low Elevation Discharge
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0 0 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	0 t	5 4 kg/t	0 t/d	SPM
Softcoke	0 t	39 kg/t	0 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			12 t/d	SPM
Colliery roads	0 Mtkm	0.12 kg/tkm	0 t/d	SPM
PWD pas	140 Mpkm	0.02 kg/pkm	7 t/d	SPM
PWD Fht	5 Mtkm	0.04 kg/tkm	1 t/d	SPM
NH-Pas	189 Mpkm	0 004 kg/pkm	2 t/d	SPM
NH-Fht	135 Mtkm	0.008 kg/tkm	3 t/d	SPM
River Disposal				
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

Annexure 3.5 contd.

FUTURE-1

Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
HOUSEHOLDS	105000 Units				
Cookstoves		45 kg/hld	13 t/d	SPM	Low Elevation Discharge
Hld solids		2 kg/hld	210 t/d	SW	Household solid waste
COAL MINING					
Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low Elevation Discharge
Overburden	0 Mm³				
Underground	0 Mt				
Land damaged due to mining					
Working Pits			0 ha	Land	
Overburden dumps			0 ha	Land	
Coal dumps			0 ha	Land	
Subsided land			0 ha	Land	
Mine fires			0 ha	Land	
Abandoned Pits			0 ha	Land	
Reclaimed land			0 ha	Land	
RIVER MINING					
Sand	0 Mt		0 Mt	Sand	
COAL WASHERIES	0 Mt				
Rejects	0.0 Mt		0 t/d	SW	Washery rejects
Reject spills	0 %		0 t/d	LW	rejects slurry
Coal spills	0 %		0 t/d	LW	coalfines slurry
POWER PLANTS					
PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	4000000	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					34	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/tkm	0	t/d	SPM
PWD pas	525	Mpkm	0.02	kg/pkm	26	t/d	SPM
PWD Fht	22	Mtkm	0.04	kg/tkm	2	t/d	SPM
NH-Pas	189	Mpkm	0.004	kg/pkm	2	t/d	SPM
NH-Fht	135	Mtkm	0.008	kg/tkm	3	t/d	SPM
River Disposal							
					437000	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

nnexure 3.5 contd.

Activity	Level of Activity	FUTURE-1 Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell HOUSEHOLDS	28000 Units				
Cookstoves		45 kg/hld	3 t/d	SPM	Low Elevation Discharge
Hld solids		2 kg/hld	56 t/d	SW	Household solid waste
COAL MINING					
Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low Elevation Discharge
Overburden	0 Mm³				
Underground	0 Mt				
Land damaged due to mining					
Working Pits			0 ha	Land	
Overburden dumps			0 ha	Land	
Coal dumps			0 ha	Land	
Subsided land			0 ha	Land	
Mine fires			0 ha	Land	
Abandoned Pits			0 ha	Land	
Reclaimed land			0 ha	Land	
RIVER MINING					
Sand	0 Mt		0 Mt	Sand	
COAL WASHERIES	0 Mt				
Rejects	0.0 Mt		0 t/d	SW	Washery rejects
Reject spills	0 %		0 t/d	LW	rejects slurry
Coal spills	0 %		0 t/d	LW	coalfines slurry
POWER PLANTS					
PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	0 t	5.4 kg/t	0 t/d	SPM
Softcoke	0 t	39 kg/t	0 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			20 t/d	SPM
Colliery roads	0 Mtkm	0.12 kg/tkm	0 t/d	SPM
PWD pas	140 Mpkm	0.02 kg/pkm	7 t/d	SPM
PWD Fht	5 Mtkm	0.04 kg/tkm	1 t/d	SPM
NH-Pas	110 Mpkm	0.004 kg/pkm	1 t/d	SPM
NH-Fht	510 Mtkm	0.008 kg/tkm	11 t/d	SPM
River Disposal				
			340000 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

nexure 3.5 contd.

FUTURE-1

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	60000 Units				
	Cookstoves		45 kg/hld	7 t/d	SPM	Low Elevation Discharge
	Hld solids		2 kg/hld	120 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0.1 Mt	2.4 kg/t	1 t/d	SPM	Low Elevation Discharge
	Overburden	0 Mm³				
	Underground	3.1 Mt				
	Land damaged due to mining					
	Working Pits			4 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			500 ha	Land	
	RIVER MINING					
	Sand	0.7 Mt		1 Mt	Sand	
	COAL WASHERIES	5.91 Mt				
	Rejects	0.8 Mt		2213 t/d	SW	Washery rejects
	Reject spills	10 %		221 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	175 GWh	0.05 kg/kWh	24 t/d	SPM	High elevation discharge
	Flyash trapped			321 t/d	SW	Converted to LW
	Bottom ash			86 t/d	SW	Converted to LW
	Ash spills			20 t/d	LW	Ash slurry
	PP-2 Emissions	140 GWh	0.05 kg/kWh	19 t/d	SPM	High elevation discharge
	Flyash trapped			309 t/d	SW	Converted to LW
	Bottom ash			82 t/d	SW	Converted to LW
	Ash spills			20 t/d	LW	Ash slurry
	PP-3 Emissions	140 GWh	0.05 kg/kWh	19 t/d	SPM	High elevation discharge
	Flyash trapped			309 t/d	SW	Converted to LW
	Bottom ash			82 t/d	SW	Converted to LW
	Ash spills			20 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	46000	t	5 4	kg/t	1	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					19	t/d	SPM
Colliery roads	28	Mtkm	0.12	kg/tkm	9	t/d	SPM
PWD pas	300	Mpkm	0 02	kg/pkm	9	t/d	SPM
PWD Fht	12	Mtkm	0.04	kg/tkm	1	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					398237	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.5 contd.

FUTURE-1

Activity	Level of Activity		Estimated unit Discharge		Estimated or Reported Discharge		Parameter	Comments
Cell HOUSEHOLDS	60000	Units						
Cookstoves			45	kg/hld	7	t/d	SPM	Low Elevation Discharge
Hld solids			2	kg/hld	120	t/d	SW	Household solid waste
COAL MINING								
Open Cast	0	Mt	0	kg/t	0	t/d	SPM	Low Elevation Discharge
Overburden	0	Mm³						
Underground	0.5	Mt						
Land damaged due to mining								
Working Pits					0	ha	Land	
Overburden dumps					0	ha	Land	
Coal dumps					0	ha	Land	
Subsided land					0	ha	Land	
Mine fires					0	ha	Land	
Abandoned Pits					0	ha	Land	
Reclaimed land					0	ha	Land	
RIVER MINING								
Sand	1.3	Mt			1	Mt	Sand	
COAL WASHERIES	3.11	Mt						
Rejects	1.0	Mt			2687	t/d	SW	Washery rejects
Reject spills	10	%			269	t/d	LW	rejects slurry
Coal spills	0	%			0	t/d	LW	coalfines slurry
POWER PLANTS								
PP-1 Emissions	266	GWh	0.03	kg/kWh	22	t/d	SPM	High elevation discharge
Flyash trapped					211	t/d	SW	Converted to LW
Bottom ash					58	t/d	SW	Converted to LW
Ash spills					27	t/d	LW	Ash slurry
PP-2 Emissions	70	GWh	0.05	kg/kWh	10	t/d	SPM	High elevation discharge
Flyash trapped					155	t/d	SW	Converted to LW
Bottom ash					41	t/d	SW	Converted to LW
Ash spills					10	t/d	LW	Ash slurry
PP-3 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High elevation discharge
Flyash trapped					0	t/d	SW	Converted to LW
Bottom ash					0	t/d	SW	Converted to LW
Ash spills					0	t/d	LW	Ash slurry

OTHER INDUSTRIES						
Steel Plant	0	t				
Fertilizer Plant	300000	t				
Explosive factory	0	t				
Hard coke	0	t	5.4	kg/t	0 t/d	SPM
Softcoke	0	t	39	kg/t	0 t/d	SPM
TRANSPORT						
Rail movements	0					
Road movements (total)					13 t/d	SPM
Colliery roads	9	Mtkm	0.12	kg/tkm	3 t/d	SPM
PWD pas	300	Mpkm	0 02	kg/pkm	9 t/d	SPM
PWD Fht	12	Mtkm	0.04	kg/tkm	1 t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0 t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0 t/d	SPM
River Disposal						
					564565 kg/d	TSS
					0 kg/d	COD
					0 kg/d	BOD
					0 kg/d	TSS
					0 kg/d	COD
					0 kg/d	BOD
					0 kg/d	TSS
					0 kg/d	COD
					0 kg/d	BOD

nexure 3.5 contd.

FUTURE-1

Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
HOUSEHOLDS	15000 Units				
Cookstoves		45 kg/hld	2 t/d	SPM	Low Elevation Discharge
Hld solids		2 kg/hld	30 t/d	SW	Household solid waste
COAL MINING					
Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low Elevation Discharge
Overburden	0 Mm³				
Underground	0 Mt				
Land damaged due to mining					
Working Pits			0 ha	Land	
Overburden dumps			0 ha	Land	
Coal dumps			0 ha	Land	
Subsided land			0 ha	Land	
Mine fires			0 ha	Land	
Abandoned Pits			0 ha	Land	
Reclaimed land			0 ha	Land	
RIVER MINING					
Sand	0 Mt		0 Mt	Sand	
COAL WASHERIES	0 Mt				
Rejects	0.0 Mt		0 t/d	SW	Washery rejects
Reject spills	0 %		0 t/d	LW	rejects slurry
Coal spills	0 %		0 t/d	LW	coalfines slurry
POWER PLANTS					
PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High elevation discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	0 t	5.4 kg/t	0 t/d	SPM
Softcoke	0 t	39 kg/t	0 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			4 t/d	SPM
Colliery roads	0 Mtkm	0.12 kg/tkm	0 t/d	SPM
PWD pas	75 Mpkm	0.02 kg/pkm	4 t/d	SPM
PWD Fht	0 Mtkm	0.04 kg/tkm	0 t/d	SPM
NH-Pas	0 Mpkm	0.004 kg/pkm	0 t/d	SPM
NH-Fht	0 Mtkm	0 008 kg/tkm	0 t/d	SPM
River Disposal				
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

Annexure 3.6 Future conditions (circa 2001) - Management Strategy I (Planned Improvements) - time pattern of solids handled and disposed of during time period 1991-2001

Cell Groups	Solids handled	Units	Circa 1991	Circa 1996	Circa 2001	Comments
1ab, 2ab	**Mining**					No coal and sand mining activity
	Coal	Mt/a	0	0	0	
	Sand	Mt/a	0	0	0	
	Overburden	Mm^3/a	0	0	0	
	Cumulative disturbed land	ha	0	0	0	
	Cumulative land reclaimed	ha	0	0	0	
	Cumulative net disturbed land	ha	0	0	0	
	Solid wastes handled					
	Flyash trapped	t/d	0	0	0	No power generation
	Bottom ash generated	t/d	0	0	0	
	Washery rejects generated	t/d	0	0	0	Domestic solid waste comprises total solid wastes. Marginal increase due to increase in population
	Household wastes generated	t/d	40	50	60	
1c, 1d, 2c	**Mining**					No increase in coal mining activity
	Coal	Mt/a	11	11	11	
	Sand	Mt/a	0	0	0	No sand mining activity
	Overburden	Mm^3/a	29	27	25	
	Cumulative disturbed land	ha	1250	1480	1750	
	Cumulative land reclaimed	ha	0	450	900	
	Cumulative net disturbed land	ha	1250	1030	850	
	Solid wastes handled					
	Flyash trapped	t/d	1070	1900	2400	Increased, more efficient power generation coupled with implementation of ESPs in Bokaro A leading to more than doubling of ash handled for disposal
	Bottom ash generated	t/d	320	520	660	
	Washery rejects generated	t/d	2800	2850	2920	Very marginal increase in washery rejects
	Household wastes generated	t/d	240	270	290	Marginal increase in domestic solid wastes due to increase in population

Annexure 3.6 contd.

Cell Groups	Solids handled	Units	Circa 1991	Circa 1996	Circa 2001	Comments
2d	**Mining**					No coal and sand mining activity
	Coal	Mt/a	0	0	0	
	Sand	Mt/a	0	0	0	
	Overburden	Mm^3/a	0	0	0	
	Cumulative disturbed land	ha	0	0	0	
	Cumulative land reclaimed	ha	0	0	0	
	Cumulative net disturbed land	ha	0	0	0	
	Solid wastes handled					
	Flyash trapped	t/d	950	1600	2000	Increased power generation. Increase in flyash and bottom ash handled. Increase in % of flyash trapped due to implementation of ESPs
	Bottom ash generated	t/d	320	430	500	
	Washery rejects generated	t/d	0	0	0	
	Household wastes generated	t/d	10	10	10	
3a, 3b, 3c, 3d, 4ab, 4d	**Mining**					Slight increase in coal mining activity
	Coal	Mt/a	17	19	21	
	Sand	Mt/a	0	0	0	No sand mining activity
	Overburden	Mm^3/a	27	20	24	
	Cumulative disturbed land	ha	4000	4300	4660	Reduction in net disturbed land due to reclamation
	Cumulative land reclaimed	ha	1700	2200	2820	
	Cumulative net disturbed land	ha	2300	2100	1840	
	Solid wastes handled					
	Flyash trapped	t/d	0	0	300	New FBC power plants in operation. Improved washery performance. New washeries lead to increase in washery rejects
	Bottom ash generated	t/d	0	0	80	
	Washery rejects generated	t/d	850	1700	2470	
	Household wastes generated	t/d	120	130	140	Marginal increase in domestic solid wastes due to increase in population

Annexure 3.6 contd.

Cell Groups	Solids handled	Units	Circa 1991	Circa 1996	Circa 2001	Comments
4c, 8a, 8b	**Mining**					Decrease in opencast mining resulting in reduced overburden
	Coal	Mt/a	10	10	10	
	Sand	Mt/a	0	3	2	
	Overburden	Mm^3/a		6	6	
	Cumulative disturbed land	ha	4000	4000	4110	Reduction in net disturbed land due to reclamation
	Cumulative land reclaimed	ha	800	1400	2360	
	Cumulative net disturbed land	ha	3200	2600	1750	
	Solid wastes handled					
	Flyash trapped	t/d	740	740	1300	New FBC units. Improved power generation (FCI and TISCO). Improved washery performance
	Bottom ash generated	t/d	200	200	350	
	Washery rejects generated	t/d	4000	3700	5140	
	Household wastes generated	t/d	300	330	360	Marginal increase in domestic solid wastes due to increase in population
6	**Mining**					No coal mining activity
	Coal	Mt/a	0	0	0	
	Sand	Mt/a	0	0	0	No sand mining activity
	Overburden	Mm^3/a	0	0	0	Bokaro steel plant (BSL, 4 Mt/a integrated iron and steel plant) is a major emitter of residuals. However, data was not accessible to the study team to arrive at reasonable estimations
	Cumulative disturbed land	ha	0	0	0	
	Cumulative land reclaimed	ha	0	0	0	
	Cumulative net disturbed land	ha	0	0	0	
	Solid wastes handled					
	Flyash trapped	t/d	0	0	0	
	Bottom ash generated	t/d	0	0	0	
	Washery rejects generated	t/d	0	0	0	
	Household wastes generated	t/d	170	190	210	

Annexure 3.6 contd.

Cell Groups	Solids handled	Units	Circa 1991	Circa 1996	Circa 2001	Comments
5, 7, 8c, 8d	**Mining**					No coal and sand mining activity
	Coal	Mt/a	0	0	0	
	Sand	Mt/a	0	0	0	
	Overburden	Mm^3/a	0	0	0	
	Cumulative disturbed land	ha	0	0	0	
	Cumulative land reclaimed	ha	0	0	0	
	Cumulative net disturbed land	ha	0	0	0	
	Solid wastes handled					
	Flyash trapped	t/d	0	0	0	No power generation
	Bottom ash generated	t/d	0	0	0	
	Washery rejects generated	t/d	0	0	0	Marginal increase in domestic solid wastes due to increase in population
	Household wastes generated	t/d	110	130	140	

Annexure 3.7 Future conditions (circa 2001) - Management Strategy I (Planned Improvements) - number of households exposed to various concentrations of air pollution (spatial distribution)

Total population: 608000

Future-2	Ambient air quality ranges ($\mu g/m^3$)			
Cell	< 200	200 ≤ 350	350 ≤ 500	> 500
1a-1b	4500	9500	0	0
1c	25000	34000	0	0
1d	0	39000	0	0
2a-2b	0	8000	6000	0
2c	0	25000	24000	0
2d	0	0	7000	0
3a	0	0	500	6500
3b	0	0	1000	6000
3c	0	0	500	6500
3d	0	0	0	5000
4a-4b	0	16000	13500	4500
4c	0	0	40000	8000
4d	0	25000	1000	0
5	0	28000	0	0
6	0	20000	85000	0
7	0	16000	12000	0
8a	0	35000	19000	0
8b	0	66000	0	0
8c-8d	5000	10000	0	0

	Total SPM Households
Future-2: Relocation strategy	204112500 $\mu g/m^3$-Households
Future-1: Planned improvements	209812500 $\mu g/m^3$-Households
Present: circa 1991	181162500 $\mu g/m^3$-Households

Annexure 3.8 Future conditions (circa 2001) - Management Strategy I (Planned Improvements) - Mortality calculations of expected number of lives prolonged

Bihar state mortality rate = 1.08%
Mortality rate reduction per $\mu g/m^3$ of reduction in respiratory particulate matter (RPM) = 0.125%

Cell No.	Ambient exposure (μg/m3) SPM		Incremental change (μg/m3) of RPM	Number of lives prolonged
	Present (circa 1991)	Future I (circa 2001)		
1a-1b	230	239	-3	-3
1c	240	244	-1	-5
1d	294	275	6	21
2a-2b	295	339	-15	-14
2c	410	348	21	68
2d	425	425	0	0
3a	456	541	-28	-13
3b	425	532	-36	-17
3c	529	541	-4	-2
3d	508	550	-14	-7
4a-4b	436	352	28	53
4c	540	467	24	99
4d	311	286	9	8
5	245	275	-10	-19
6	375	396	-7	-51
7	325	339	-5	-9
8a	369	338	10	42
8b	362	275	29	117
8c-8d	242	242	0	0
Total				268

Note: One household consists of 5 people.

Annexure 3.9 Future conditions (circa 2001) - Management Strategy I (Planned Improvements) - estimated sectoral shares of suspended particulate matter (SPM) contribution to air quality

Cell	Annual average ambient concentration ($\mu g/m^3$)	Percentage contribution of SPM to ambient air quality				
		Coal mining	Household cooking	Transport	Power	Other
1a-1b	225	0	29	59	12	0
1c	225	42	16	32	7	3
1d	325	48	14	33	5	0
2a-2b	275	0	31	62	7	0
2c	375	44	9	24	3	20
2d	425	0	47	48	5	0
3a	500	73	1	22	3	1
3b	450	62	3	33	2	0
3c	525	0	10	84	6	0
3d	525	26	3	62	2	7
4a-4b	350	0	4	41	3	52
4c	600	29	13	49	2	7
4d	325	26	17	35	4	18
5	250	0	17	75	8	0
6	275	0	26	69	5	0
7	350	0	12	81	7	0
8a	375	3	24	65	4	4
8b	350	0	34	63	3	0
8c-8d	225	0	31	62	7	0

circa 2001			*Relocation*	*From 1d to 1c*	10000	Mining	1d	0 2 Mt/yr
Annual population growth rate	2 1	%		From 3d to 4b	2000		3d	0 15 Mt/yr
Annual highway pkm growth rate (PASSENGER)	2	%		From 4c to 4d	12000		4c	0 2 Mt/yr
Annual highway tkm growth rate (FREIGHT)	2	%		From 8a to 8b	6000		8a	0 15 Mt/yr

CELL #		1a-1b	1c	1d	2a-2b	2c	2d	3a	3b	3c	3d	4a-4b	4c	4d	5	6	7	8a	8b	8c-8d
HOUSEHOLDS	Units	14000	59000	39000	14000	49000	7000	7000	7000	7000	5000	30000	48000	26000	28000	105000	28000	54000	66000	15000
COAL MINING																				
Open Cast	Mt	0	2 5	3 2	0	4 5	0	8 2	3 2	0	1 35	0	2 6	0 4	0	0	0	0 25	0	0
Overburden	Mm³	0	10 8	7 3	0	7	0	15 5	4 1	0	3 4	0	5 9	0 7	0	0	0	0	0	0
Underground	Mt	0	0 5	0 5	0	0 2	0	0 3	2 5	0 4	4 5	0	2 5	0 6	0	0	0	3 1	0 5	0
Land damaged due to mining																				
Working Pits	ha	0	100	128	0	180	0	328	128	0	54	0	104	16	0	0	0	10	0	0
Overburden dumps	ha	0	43	29	0	28	0	62	16	0	14	0	24	3	0	0	0	0	0	0
Coal dumps	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subsided land	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine fires	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abandoned Pits	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reclaimed land	ha	0	300	300	0	300	0	500	0	0	300	0	1100	300	0	0	0	500	0	0
RIVER MINING																				
Sand	Mt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 7	1 3	0
RAW COAL FEED WASHERIES	Mt	0	3 4	2 4	0	0	0	2 8	0	0	0 72	0	0 4	0	0	0	0	5 91	3 11	0
Rejects	Mt	0 00	0 63	0 44	0 00	0 00	0 00	0 90	0 00	0 00	0 00	0 00	0 09	0 00	0 00	0 00	0 00	0 81	0 98	0 00
Reject spills	%	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0
Coal spills	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POWER PLANTS																				
PP-1 Activity	GWh	0	832	0	0	0	3416	140	0	0	0	0	0	0	0	0	0	175	266	0
PP-1 Dis factor	kg/kWh	0	0 02	0	0	0	0 02	0 05	0	0	0	0	0	0	0	0	0	0 05	0 03	0
PP-1 Ash factor	kg/kWh	0	0 28	0	0	0	0 29	1 07	0	0	0	0	0	0	0	0	0	0 9	0 4	0
PP-1 Ash Spills	%	0	10	0	0	0	50	5	0	0	0	0	0	0	0	0	0	5	10	0
PP-2 Activity	GWh	0	3311	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	70	0
PP-2 Dis factor	kg/kWh	0	0 02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 05	0 05	0
PP-2 Ash factor	kg/kWh	0	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1 07	1.07	0
PP-2 Ash Spills	%	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0

Annexure 3.10 contd.

CELL #		1a-1b	1c	1d	2a-2b	2c	2d	3a	3b	3c	3d	4a-4b	4c	4d	5	6	7	8a	8b	8c-8d
PP-3 Activity	GWh	0	140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	0	0
PP-3 Dis factor	kg/kWh	0	0 05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 05	0	0
PP-3 Ash factor	kg/kWh	0	1 07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 07	0	0
PP-3 Ash Spills	%	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0
OTHER INDUSTRIES																				
Steel Plant	t	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4000000	0	0	0	0
Fertilizer Plant	t	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	300000	0
Explosive factory	t	0	40000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hard coke	t	0	0	0	0	0	0	4300	18000	0	108600	400000	103000	0	0	0	0	46000	0	0
Softcoke	t	0	9000	0	0	133000	0	6500	0	0	8100	300000	22600	19300	0	0	0	0	0	0
TRANSPORT																				
Rail movements		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Road movements																				
Sand movement	Mtkm	0	0	0	0	0	0	0	0	0	5	0	10	0	0	0	0	12	6	0
NH-2, NH-32, NH-23, & other traffic																				
Passenger	Mpkm	0	0	0	0	0	0	0	0	55	55	533	55	0	189	189	110	0	0	0
Freight	Mtkm	0	0	0	0	0	0	0	0	255	255	764	255	1	135	135	510	0	0	0
Other Freight	Mtkm	2	10	10	2	10	1	1	1	1	1	5	12	2	5	22	5	12	12	0
Coll roads	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PWD roads	%	0	50	50	0	50	50	0	30	50	30	0	50	30	0	0	0	50	50	0
River Disposal																				
1	TSS	0	554260	7194286	0	1291900	2609669	0	0	156400	0	0	80	0	0	437000	340000	398237	564565	0

Note Data taken from Annexure 3 1 along with household relocations and additional mining in vacated areas (see text for details)

exure 3.11 Future conditions (circa 2001) - Management Strategy II (Planned Improvements + Relocation) - basic data for residual generation - cell-wise

FUTURE-2 (Planned Improvements + Relocation)

Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
HOUSEHOLDS	14000 Units				
Cookstoves		45 kg/hld	2 t/d	SPM	Low discharge levels
Hld solids		2 kg/hld	28 t/d	SW	Household solid waste
COAL MINING					
Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
Overburden	0 Mm³				
Underground	0 Mt				
Land damaged due to mining					
Working Pits			0 ha	Land	
Overburden dumps			0 ha	Land	
Coal dumps			0 ha	Land	
Subsided land			0 ha	Land	
Mine fires			0 ha	Land	
Abandoned Pits			0 ha	Land	
Reclaimed land			0 ha	Land	
RIVER MINING					
Sand	0 Mt		0 Mt	Sand	
COAL WASHERIES	0 Mt				
Rejects	0 Mt		0 t/d	SW	Washery rejects
Reject spills	0 %		0 t/d	LW	rejects slurry
Coal spills	0 %		0 t/d	LW	coalfines slurry
POWER PLANTS					
PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					4	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	70	Mpkm	0.02	kg/pkm	4	t/d	SPM
PWD Fht	2	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	14000 Units				
	Cookstoves		45 kg/hld	2 t/d	SPM	Low discharge levels
2b	Hld solids		2 kg/hld	28 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0.44 Mt		0 t/d	SW	Washery rejects
	Reject spills	10 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					4	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	70	Mpkm	0.02	kg/pkm	4	t/d	SPM
PWD Fht	2	Mtkm	0 04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

nnexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	59000 Units				
	Cookstoves		45 kg/hld	7 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	118 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	2.5 Mt	2.4 kg/t	16 t/d	SPM	Low discharge levels
	Overburden	10.8 Mm³				
	Underground 1c	Mt				
	Land damaged due to mining					
	Working Pits			100 ha	Land	
	Overburden dumps			43 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			300 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	3.4 Mt				
	Rejects	0.63 Mt		1719 t/d	SW	Washery rejects
	Reject spills	10 %		172 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	832 GWh	0.02 kg/kWh	46 t/d	SPM	High level discharge
	Flyash trapped			465 t/d	SW	Converted to LW
	Bottom ash			128 t/d	SW	Converted to LW
	Ash spills			59 t/d	LW	Ash slurry
	PP-2 Emissions	3311 GWh	0.02 kg/kWh	181 t/d	SPM	High level discharge
	Flyash trapped			1633 t/d	SW	Converted to LW
	Bottom ash			454 t/d	SW	Converted to LW
	Ash spills			209 t/d	LW	Ash slurry
	PP-3 Emissions	140 GWh	0.05 kg/kWh	19 t/d	SPM	High level discharge
	Flyash trapped			309 t/d	SW	Converted to LW
	Bottom ash			82 t/d	SW	Converted to LW
	Ash spills			20 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	40000	t					
Hard coke	0	t	5 4	kg/t	0	t/d	SPM
Softcoke	9000	t	39	kg/t	1	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					14	t/d	SPM
Colliery roads	13	Mtkm	0 12	kg/pkm	4	t/d	SPM
PWD pas	295	Mpkm	0 02	kg/pkm	9	t/d	SPM
PWD Fht	10	Mtkm	0 04	kg/tkm	1	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					554260	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	39000 Units				
	Cookstoves		45 kg/hld	5 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	78 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	3.2 Mt	2.4 kg/t	21 t/d	SPM	Low discharge levels
	Overburden	7.3 Mm³				
	Underground	0.5 Mt				
	Land damaged due to mining					
	Working Pits			128 ha	Land	
	Overburden dumps			29 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			300 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	2.4 Mt				
	Rejects	0.63 Mt		1196 t/d	SW	Washery rejects
	Reject spills	10 %		120 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5 4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					13	t/d	SPM
Colliery roads	19	Mtkm	0.12	kg/pkm	6	t/d	SPM
PWD pas	195	Mpkm	0.02	kg/pkm	6	t/d	SPM
PWD Fht	10	Mtkm	0.04	kg/tkm	1	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					7194286	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
HOUSEHOLDS	49000 Units				
Cookstoves		45 kg/hld	6 t/d	SPM	Low discharge levels
Hld solids		2 kg/hld	98 t/d	SW	Household solid waste
COAL MINING					
Open Cast	4.5 Mt	2.4 kg/t	30 t/d	SPM	Low discharge levels
Overburden	7 Mm³				
Underground	0 2 Mt				
Land damaged due to mining					
Working Pits			180 ha	Land	
Overburden dumps			28 ha	Land	
Coal dumps			0 ha	Land	
Subsided land			0 ha	Land	
Mine fires			0 ha	Land	
Abandoned Pits			0 ha	Land	
Reclaimed land			300 ha	Land	
RIVER MINING					
Sand	0 Mt		0 Mt	Sand	
COAL WASHERIES	0 Mt				
Rejects	0.00 Mt		0 t/d	SW	Washery rejects
Reject spills	0 %		0 t/d	LW	rejects slurry
Coal spills	0 %		0 t/d	LW	coalfines slurry
POWER PLANTS					
PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	133000	t	39	kg/t	14	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					16	t/d	SPM
Colliery roads	24	Mtkm	0.12	kg/pkm	8	t/d	SPM
PWD pas	245	Mpkm	0.02	kg/pkm	7	t/d	SPM
PWD Fht	10	Mtkm	0.04	kg/tkm	1	t/d	SPM
NH-Pas	0	Mpkm	0 004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					1291900	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	7000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low discharge levels
2d	Hld solids		2 kg/hld	14 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0 00 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	3416 GWh	0.02 kg/kWh	187 t/d	SPM	High level discharge
	Flyash trapped			1984 t/d	SW	Converted to LW
	Bottom ash			543 t/d	SW	Converted to LW
	Ash spills			1263 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					1	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	35	Mpkm	0.02	kg/pkm	1	t/d	SPM
PWD Fht	1	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					2609669	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	7000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low discharge levels
3a	Hld solids		2 kg/hld	14 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	8.2 Mt	2.4 kg/t	54 t/d	SPM	Low discharge levels
	Overburden	15.5 Mm^3				
	Underground	0.3 Mt				
	Land damaged due to mining					
	Working Pits			328 ha	Land	
	Overburden dumps			62 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			500 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	2.8 Mt				
	Rejects	0 00 Mt		2466 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	140 GWh	0.05 kg/kWh	19 t/d	SPM	High level discharge
	Flyash trapped			309 t/d	SW	Converted to LW
	Bottom ash			82 t/d	SW	Converted to LW
	Ash spills			20 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	4300	t	5 4	kg/t	0	t/d	SPM
Softcoke	6500	t	39	kg/t	1	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					16	t/d	SPM
Colliery roads	42	Mtkm	0.12	kg/pkm	14	t/d	SPM
PWD pas	35	Mpkm	0.02	kg/pkm	2	t/d	SPM
PWD Fht	1	Mtkm	0 04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	7000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	14 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	3.2 Mt	2.4 kg/t	21 t/d	SPM	Low discharge levels
	Overburden	4.1 Mm³				
	Underground	2.5 Mt				
	Land damaged due to mining					
	Working Pits			128 ha	Land	
	Overburden dumps			16 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0.00 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	18000 t	5.4 kg/t	0 t/d	SPM
Softcoke	0 t	39 kg/t	0 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			11 t/d	SPM
Colliery roads	29 Mtkm	0.12 kg/pkm	9 t/d	SPM
PWD pas	35 Mpkm	0.02 kg/pkm	1 t/d	SPM
PWD Fht	1 Mtkm	0.04 kg/tkm	0 t/d	SPM
NH-Pas	0 Mpkm	0.004 kg/pkm	0 t/d	SPM
NH-Fht	0 Mtkm	0.008 kg/tkm	0 t/d	SPM
River Disposal				
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

Annexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	7000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	14 t/d	SW	Household solid waste.
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	0.4 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0.00 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					8	t/d	SPM
Colliery roads	2	Mtkm	0 12	kg/pkm	1	t/d	SPM
PWD pas	35	Mpkm	0.02	kg/pkm	1	t/d	SPM
PWD Fht	1	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	55	Mpkm	0.004	kg/pkm	1	t/d	SPM
NH-Fht	255	Mtkm	0 008	kg/tkm	6	t/d	SPM
River Disposal							
					156400	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	5000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low discharge levels
3d	Hld solids		2 kg/hld	10 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	1.35 Mt	2.4 kg/t	9 t/d	SPM	Low discharge levels
	Overburden	3.4 Mm³				
	Underground	4.5 Mt				
	Land damaged due to mining					
	Working Pits			54 ha	Land	
	Overburden dumps			14 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			300 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0.72 Mt				
	Rejects	0.00 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	0 t			
Explosive factory	0 t			
Hard coke	108600 t	5.4 kg/t	2 t/d	SPM
Softcoke	8100 t	39 kg/t	1 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			18 t/d	SPM
Colliery roads	34 Mtkm	0.12 kg/pkm	11 t/d	SPM
PWD pas	25 Mpkm	0.02 kg/pkm	1 t/d	SPM
PWD Fht	1 Mtkm	0 04 kg/tkm	0 t/d	SPM
NH-Pas	55 Mpkm	0.004 kg/pkm	1 t/d	SPM
NH-Fht	255 Mtkm	0.008 kg/tkm	6 t/d	SPM
River Disposal				
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

nnexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	30000 Units				
	Cookstoves		45 kg/hld	4 t/d	SPM	Low discharge levels
4b	Hld solids		2 kg/hld	60 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0.00 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	400000	t	5.4	kg/t	6	t/d	SPM
Softcoke	300000	t	39	kg/t	32	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					30	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	150	Mpkm	0.02	kg/pkm	8	t/d	SPM
PWD Fht	5	Mtkm	0 04	kg/tkm	1	t/d	SPM
NH-Pas	533	Mpkm	0 004	kg/pkm	5	t/d	SPM
NH-Fht	764	Mtkm	0.008	kg/tkm	17	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	26000 Units				
	Cookstoves		45 kg/hld	3 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	52 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0.4 Mt	2.4 kg/t	3 t/d	SPM	Low discharge levels
	Overburden	0 7 Mm³				
	Underground	0.6 Mt				
	Land damaged due to mining					
	Working Pits			16 ha	Land	
	Overburden dumps			3 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			300 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0.90 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	19300	t	39	kg/t	2	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					7	t/d	SPM
Colliery roads	5	Mtkm	0.12	kg/pkm	2	t/d	SPM
PWD pas	130	Mpkm	0.02	kg/pkm	5	t/d	SPM
PWD Fht	2	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	1	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	48000 Units				
	Cookstoves		45 kg/hld	6 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	96 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	2.6 Mt	2.4 kg/t	17 t/d	SPM	Low discharge levels
	Overburden	5.9 Mm³				
	Underground	2.5 Mt				
	Land damaged due to mining					
	Working Pits			104 ha	Land	
	Overburden dumps			24 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			1100 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0.4 Mt				
	Rejects	0 00 Mt		244 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES						
Steel Plant	0	t				
Fertilizer Plant	0	t				
Explosive factory	0	t				
Hard coke	103000	t	5.4	kg/t	2 t/d	SPM
Softcoke	22600	t	39	kg/t	2 t/d	SPM
TRANSPORT						
Rail movements	0					
Road movements (total)					26 t/d	SPM
Colliery roads	35	Mtkm	0.12	kg/pkm	12 t/d	SPM
PWD pas	240	Mpkm	0.02	kg/pkm	7 t/d	SPM
PWD Fht	12	Mtkm	0 04	kg/tkm	1 t/d	SPM
NH-Pas	55	Mpkm	0.004	kg/pkm	1 t/d	SPM
NH-Fht	255	Mtkm	0 008	kg/tkm	6 t/d	SPM
River Disposal						
					80 kg/d	TSS
					0 kg/d	COD
					0 kg/d	BOD
					0 kg/d	TSS
					0 kg/d	COD
					0 kg/d	BOD
					0 kg/d	TSS
					0 kg/d	COD
					0 kg/d	BOD

Annexure 3.11 contd.

	Activity	Level of Activity		FUTURE-2 (Planned Improvements + Relocation) Estimated unit Discharge		Estimated or Reported Discharge		Parameter	Comments
Cell	HOUSEHOLDS	28000	Units						
	Cookstoves			45	kg/hld	3	t/d	SPM	Low discharge levels
	Hld solids			2	kg/hld	56	t/d	SW	Household solid waste
	COAL MINING								
	Open Cast	0	Mt	0	kg/t	0	t/d	SPM	Low discharge levels
	Overburden	0	Mm³						
	Underground	0	Mt						
	Land damaged due to mining								
	Working Pits					0	ha	Land	
	Overburden dumps					0	ha	Land	
	Coal dumps					0	ha	Land	
	Subsided land					0	ha	Land	
	Mine fires					0	ha	Land	
	Abandoned Pits					0	ha	Land	
	Reclaimed land					0	ha	Land	
	RIVER MINING								
	Sand	0	Mt			0	Mt	Sand	
	COAL WASHERIES	0	Mt						
	Rejects	0.00	Mt			0	t/d	SW	Washery rejects
	Reject spills	0	%			0	t/d	LW	rejects slurry
	Coal spills	0	%			0	t/d	LW	coalfines slurry
	POWER PLANTS								
	PP-1 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry
	PP-2 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry
	PP-3 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry

OTHER INDUSTRIES						
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5 4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	*0*						
Road movements (total)					12	t/d	SPM
Colliery roads	0	Mtkm	0 12	kg/pkm	0	t/d	SPM
PWD pas	140	Mpkm	0 02	kg/pkm	7	t/d	SPM
PWD Fht	5	Mtkm	0 04	kg/tkm	1	t/d	SPM
NH-Pas	189	Mpkm	0.004	kg/pkm	2	t/d	SPM
NH-Fht	135	Mtkm	0 008	kg/tkm	3	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity		Estimated unit Discharge		Estimated or Reported Discharge		Parameter	Comments
:ell	HOUSEHOLDS	105000	Units						
	Cookstoves			45	kg/hld	13	t/d	SPM	Low discharge levels
	Hld solids			2	kg/hld	210	t/d	SW	Household solid waste
	COAL MINING								
	Open Cast	0	Mt	0	kg/t	0	t/d	SPM	Low discharge levels
	Overburden	0	Mm³						
	Underground	0	Mt						
	Land damaged due to mining								
	Working Pits					0	ha	Land	
	Overburden dumps					0	ha	Land	
	Coal dumps					0	ha	Land	
	Subsided land					0	ha	Land	
	Mine fires					0	ha	Land	
	Abandoned Pits					0	ha	Land	
	Reclaimed land					0	ha	Land	
	RIVER MINING								
	Sand	0	Mt			0	Mt	Sand	
	COAL WASHERIES	0	Mt						
	Rejects	0.00	Mt			0	t/d	SW	Washery rejects
	Reject spills	0	%			0	t/d	LW	rejects slurry
	Coal spills	0	%			0	t/d	LW	coalfines slurry
	POWER PLANTS								
	PP-1 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry
	PP-2 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry
	PP-3 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5 4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					20	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	140	Mpkm	0 02	kg/pkm	7	t/d	SPM
PWD Fht	5	Mtkm	0.04	kg/tkm	1	t/d	SPM
NH-Pas	110	Mpkm	0 004	kg/pkm	1	t/d	SPM
NH-Fht	510	Mtkm	0 008	kg/tkm	11	t/d	SPM
River Disposal							
					340000	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

nexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	54000 Units				
	Cookstoves		45 kg/hld	7 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	108 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 25 Mt	2.4 kg/t	2 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	3.1 Mt				
	Land damaged due to mining					
	Working Pits			10 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			500 ha	Land	
	RIVER MINING					
	Sand	0.7 Mt		1 Mt	Sand	
	COAL WASHERIES	5 91 Mt				
	Rejects	0.81 Mt		2213 t/d	SW	Washery rejects
	Reject spills	10 %		221 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	175 GWh	0.05 kg/kWh	24 t/d	SPM	High level discharge
	Flyash trapped			321 t/d	SW	Converted to LW
	Bottom ash			86 t/d	SW	Converted to LW
	Ash spills			20 t/d	LW	Ash slurry
	PP-2 Emissions	140 GWh	0.05 kg/kWh	19 t/d	SPM	High level discharge
	Flyash trapped			309 t/d	SW	Converted to LW
	Bottom ash			82 t/d	SW	Converted to LW
	Ash spills			20 t/d	LW	Ash slurry
	PP-3 Emissions	140 GWh	0.05 kg/kWh	19 t/d	SPM	High level discharge
	Flyash trapped			309 t/d	SW	Converted to LW
	Bottom ash			82 t/d	SW	Converted to LW
	Ash spills			20 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	46000	t	5 4	kg/t	1	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					18	t/d	SPM
Colliery roads	29	Mtkm	0.12	kg/pkm	9	t/d	SPM
PWD pas	270	Mpkm	0.02	kg/pkm	8	t/d	SPM
PWD Fht	12	Mtkm	0.04	kg/tkm	1	t/d	SPM
NH-Pas	0	Mpkm	0 004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0 008	kg/tkm	0	t/d	SPM
River Disposal							
					398237	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	66000 Units				
	Cookstoves		45 kg/hld	8 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	132 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	0 5 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	1.3 Mt		1 Mt	Sand	
	COAL WASHERIES	3.11 Mt				
	Rejects	0.98 Mt		2687 t/d	SW	Washery rejects
	Reject spills	10 %		269 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	266 GWh	0.03 kg/kWh	22 t/d	SPM	High level discharge
	Flyash trapped			211 t/d	SW	Converted to LW
	Bottom ash			58 t/d	SW	Converted to LW
	Ash spills			27 t/d	LW	Ash slurry
	PP-2 Emissions	70 GWh	0.05 kg/kWh	10 t/d	SPM	High level discharge
	Flyash trapped			155 t/d	SW	Converted to LW
	Bottom ash			41 t/d	SW	Converted to LW
	Ash spills			10 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES								
Steel Plant	0	t						
Fertilizer Plant	300000	t						
Explosive factory	0	t						
Hard coke	0	t	5 4	kg/t	0	t/d	SPM	
Softcoke	0	t	39	kg/t	0	t/d	SPM	
TRANSPORT								
Rail movements	0							
Road movements (total)					14	t/d	SPM	
Colliery roads	9	Mtkm	0 12	kg/pkm	3	t/d	SPM	
PWD pas	330	Mpkm	0 02	kg/pkm	10	t/d	SPM	
PWD Fht	12	Mtkm	0.04	kg/tkm	1	t/d	SPM	
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM	
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM	
River Disposal								
					564565	kg/d	TSS	
					0	kg/d	COD	
					0	kg/d	BOD	
					0	kg/d	TSS	
					0	kg/d	COD	
					0	kg/d	BOD	
					0	kg/d	TSS	
					0	kg/d	COD	
					0	kg/d	BOD	

Annexure 3.11 contd.

FUTURE-2 (Planned Improvements + Relocation)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	15000 Units				
	Cookstoves		45 kg/hld	2 t/d	SPM	Low discharge levels
:8d	Hld solids		2 kg/hld	30 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0 00 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5 4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					4	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	75	Mpkm	0.02	kg/pkm	4	t/d	SPM
PWD Fht	0	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0 004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0 008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.12 Future conditions (circa 2001) - Management Strategy II (Planned Improvements + Relocation) - time pattern of solids generation and disposal during time period 1991-2001

Cell Groups	Solids handled	Units	Circa 1991	Circa 1996	Circa 2001	Comments
1ab, 2ab	**Mining**					No coal and sand mining activity
	Coal	Mt/a	0	0	0	
	Sand	Mt/a	0	0	0	
	Overburden	Mm^3/a	0	0	0	
	Cumulative disturbed land	ha	0	0	0	
	Cumulative land reclaimed	ha	0	0	0	
	Cumulative net disturbed land	ha	0	0	0	
	Solid wastes handled					
	Flyash trapped	t/d	0	0	0	No power generation
	Bottom ash generated	t/d	0	0	0	
	Washery rejects generated	t/d	0	0	0	Domestic solid waste comprises total solid wastes. Marginal increase due to increase in population
	Household wastes generated	t/d	40	50	60	
1c, 1d, 2c	**Mining**					No increase in coal mining activity
	Coal	Mt/a	11	11	11	
	Sand	Mt/a	0	0	0	No sand mining activity
	Overburden	Mm^3/a	29	27	25	
	Cumulative disturbed land	ha	1250	1500	1750	
	Cumulative land reclaimed	ha	0	450	900	
	Cumulative net disturbed land	ha	1250	1050	850	
	Solid wastes handled					
	Flyash trapped	t/d	1070	1900	2400	Increased, more efficient power generation coupled with implementation of ESPs in Bokaro A leading to more than doubling of ash handled for disposal
	Bottom ash generated	t/d	320	520	660	
	Washery rejects generated	t/d	2800	2850	2920	Very marginal increase in washery rejects
	Household wastes generated	t/d	240	270	300	Marginal increase in domestic solid wastes due to increase in population

Annexure 3.12 contd.

Cell Groups	Solids handled	Units	Circa 1991	Circa 1996	Circa 2001	Comments
2d	**Mining**					No coal and sand mining activity
	Coal	Mt/a	0	0	0	
	Sand	Mt/a	0	0	0	
	Overburden	Mm^3/a	0	0	0	
	Cumulative disturbed land	ha	0	0	0	
	Cumulative land reclaimed	ha	0	0	0	
	Cumulative net disturbed land	ha	0	0	0	
	Solid wastes handled					
	Flyash trapped	t/d	950	1600	2000	Increased power generation. Increase in flyash and bottom ash handled. Increase in % of flyash trapped due to implementation of ESPs
	Bottom ash generated	t/d	320	430	500	
	Washery rejects generated	t/d	0	0	0	
	Household wastes generated	t/d	10	10	10	
3a, 3b, 3c, 3d, 4ab, 4d	**Mining**					Slight increase in coal mining activity
	Coal	Mt/a	17	19	21	
	Sand	Mt/a	0	0	0	No sand mining activity
	Overburden	Mm^3/a	27	20	24	
	Cumulative disturbed land	ha	4000	4300	4670	Marginal increase in cumulative disturbed land (over Scenario I) due to additional mining on vacated land
	Cumulative land reclaimed	ha	1700	2200	2820	
	Cumulative net disturbed land	ha	2300	2100	1850	
	Solid wastes handled					
	Flyash trapped	t/d	0	0	300	New FBC power plants in operation. Improved washery performance. New washeries lead to increase in washery rejects
	Bottom ash generated	t/d	0	0	80	
	Washery rejects generated	t/d	850	1700	2500	
	Household wastes generated	t/d	120	130	160	Increase in domestic solid wastes due to increase in population due to relocation activity

Annexure 3.12 contd.

Cell Groups	Solids handled	Units	Circa 1991	Circa 1996	Circa 2001	Comments
4c, 8a, 8b	**Mining**					Decrease in opencast mining resulting in reduced overburden
	Coal	Mt/a	10	10	10	
	Sand	Mt/a	3	3	2	
	Overburden	Mm^3/a	16	6	6	Decrease in sand mining activity
	Cumulative disturbed land	ha	4000	4000	4120	Marginal increase in cumulative disturbed land (over Scenario I) due to additional mining on vacated land
	Cumulative land reclaimed	ha	800	1400	2360	
	Cumulative net disturbed land	ha	3200	2600	1760	
	Solid wastes handled					
	Flyash trapped	t/d	740	740	1300	New FBC units. Improved power generation (FCI and TISCO). Improved washery performance
	Bottom ash generated	t/d	200	200	350	
	Washery rejects generated	t/d	4000	3700	5140	
	Household wastes generated	t/d	300	330	340	Marginal decrease in domestic solid wastes in comparison with Scenario I due to relocation activity
6	**Mining**					No coal mining activity
	Coal	Mt/a	0	0	0	
	Sand	Mt/a	0	0	0	No sand mining activity
	Overburden	Mm^3/a	0	0	0	Bokaro steel plant (BSL, 4 Mt/a integrated iron and steel plant) is a major emitter of residuals. However, data was not accessible to the study team to arrive at reasonable estimations
	Cumulative disturbed land	ha	0	0	0	
	Cumulative land reclaimed	ha	0	0	0	
	Cumulative net disturbed land	ha	0	0	0	
	Solid wastes handled					
	Flyash trapped	t/d	0	0	0	
	Bottom ash generated	t/d	0	0	0	
	Washery rejects generated	t/d	0	0	0	
	Household wastes generated	t/d	170	190	210	

Annexure 3.12 contd.

Cell Groups	Solids handled	Units	Circa 1991	Circa 1996	Circa 2001	Comments
5, 7, 8c, 8d	**Mining**					No coal and sand mining activity
	Coal	Mt/a	0	0	0	
	Sand	Mt/a	0	0	0	
	Overburden	Mm^3/a	0	0	0	
	Cumulative disturbed land	ha	0	0	0	
	Cumulative land reclaimed	ha	0	0	0	
	Cumulative net disturbed land	ha	0	0	0	
	Solid wastes handled					
	Flyash trapped	t/d	0	0	0	
	Bottom ash generated	t/d	0	0	0	No power generation
	Washery rejects generated	t/d	0	0	0	
	Household wastes generated	t/d	110	130	140	Marginal increase in domestic solid wastes due to increase in population

Annexure 3.13 Future conditions (circa 2001) - spatial distribution of population exposure to air pollution, SPM, Management Strategy II (Planned Improvements + Relocation) and comparisons with Management Strategy I (Planned Improvement) and present (circa 1991)

Total population: 608000

Future-2	Ambient air quality ranges ($\mu g/m^3$)			
Cell	< 200	200 ≤ 350	350 ≤ 500	> 500
1a-1b	4500	9500	0	0
1c	25000	34000	0	0
1d	0	39000	0	0
2a-2b	0	8000	6000	0
2c	0	25000	24000	0
2d	0	0	7000	0
3a	0	0	500	6500
3b	0	0	1000	6000
3c	0	0	500	6500
3d	0	0	0	5000
4a-4b	0	16000	13500	4500
4c	0	0	40000	8000
4d	0	25000	1000	0
5	0	28000	0	0
6	0	20000	85000	0
7	0	16000	12000	0
8a	0	35000	19000	0
8b	0	66000	0	0
8c-8d	5000	10000	0	0

	Total SPM Households
Future-2: Relocation strategy	204112500 $\mu g/m^3$-Households
Future-1: Planned improvements	209812500 $\mu g/m^3$-Households
Present: circa 1991	181162500 $\mu g/m^3$-Households

Annexure 3.14 Future conditions (circa 2001) - Management Strategy II (Planned Improvements + Relocation) - estimated sectoral shares of suspended particulate matter (SPM) contribution to air quality

Same as Annexure 3.9

circa 2001			Relocation			Mining			
Annual population growth rate	2 1	%		From 1d to 1c	10000		1d	0 2 Mt/yr	Haul roads dust reduction = 50 %
Annual highway pkm growth rate (PASSENGER)	2	%		From 3d to 4b	2000		3d	0 15 Mt/yr	Colliery roads and PWD roads improvements as given in data Table below
Annual highway tkm growth rate (FREIGHT).	2	%		From 4c to 4d	12000		4c	0 2 Mt/yr	
				From 8a to 8b	6000		8a	0 15 Mt/yr	

CELL #		1a-1b	1c	1d	2a-2b	2c	2d	3a	3b	3c	3d	4a-4b	4c	4d	5	6	7	8a	8b	8c-8d
HOUSEHOLDS	Units	14000	59000	39000	14000	49000	7000	7000	7000	7000	5000	30000	48000	26000	28000	105000	28000	54000	66000	15000
COAL MINING																				
Open Cast	Mt	0	2.5	3 2	0	4 5	0	8 2	3 2	0	1 35	0	2 6	0 4	0	0	0	0 25	0	0
Overburden	Mm³	0	10 8	7 3	0	7	0	15 5	4 1	0	3 4	0	5 9	0 7	0	0	0	0	0	0
Underground	Mt	0	0 5	0 5	0	0 2	0	0 3	2 5	0 4	4 5	0	2 5	0 6	0	0	0	3 1	0 5	0
Land damaged due to mining																				
Working Pits	ha	0	100	128	0	180	0	328	128	0	54	0	104	16	0	0	0	10	0	0
Overburden dumps	ha	0	43	29	0	28	0	62	16	0	14	0	24	3	0	0	0	0	0	0
Coal dumps	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subsided land	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine fires	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abandoned Pits	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reclaimed land	ha	0	300	300	0	300	0	500	0	0	300	0	1100	300	0	0	0	500	0	0
RIVER MINING																				
Sand	Mt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 7	1 3	0
RAW COAL FEED WASHERIES	Mt	0	3 4	2 4	0	0	0	2 8	0	0	0 72	0	0 4	0	0	0	0	5 91	3 11	0
Rejects	Mt	0 00	0 63	0 44	0 00	0 00	0 00	0 90	0 00	0 00	0 00	0 00	0 09	0 00	0 00	0 00	0 00	0 81	0 98	0 00
Reject spills	%	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0
Coal spills	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POWER PLANTS																				
PP-1 Activity	GWh	0	832	0	0	0	3416	140	0	0	0	0	0	0	0	0	0	175	266	0
PP-1 Dis factor	kg/kWh	0	0 02	0	0	0	0 02	0 05	0	0	0	0	0	0	0	0	0	0 05	0 03	0
PP-1 Ash factor	kg/kWh	0	0 28	0	0	0	0 29	1 07	0	0	0	0	0	0	0	0	0	0 9	0 4	0
PP-1 Ash Spills	%	0	10	0	0	0	50	5	0	0	0	0	0	0	0	0	0	5	10	0
PP-2 Activity	GWh	0	3311	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	70	0
PP-2 Dis factor	kg/kWh	0	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 05	0 05	0
PP-2 Ash factor	kg/kWh	0	0 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 07	1 07	0
PP-2 Ash Spills	%	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0

Annexure 3.15 contd.

CELL #		1a-1b	1c	1d	2a-2b	2c	2d	3a	3b	3c	3d	4a-4b	4c	4d	5	6	7	8a	8b	8c-8d
PP-3 Activity	GWh	0	140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	0	0
PP-3 Dis factor	kg/kWh	0	0 05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 05	0	0
PP-3 Ash factor	kg/kWh	0	1 07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 07	0	0
PP-3 Ash Spills	%	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0
OTHER INDUSTRIES																				
Steel Plant	t	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4000000	0	0	0	0
Fertilizer Plant	t	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	300000	0
Explosive factory	t	0	40000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hard coke	t	0	0	0	0	0	0	4300	18000	0	108600	400000	103000	0	0	0	0	46000	0	0
Softcoke	t	0	9000	0	0	133000	0	6500	0	0	8100	300000	22600	19300	0	0	0	0	0	0
TRANSPORT																				
Rail movements		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Road movements																				
Sand movement	Mtkm	0	0	0	0	0	0	0	0	0	5	0	10	0	0	0	0	12	6	0
NH-2, NH-32, NH-23, & other traffic																				
Passenger	Mpkm	0	0	0	0	0	0	0	0	55	55	533	55	0	189	189	110	0	0	0
Freight	Mtkm	0	0	0	0	0	0	0	0	255	255	764	255	1	135	135	510	0	0	0
Other Freight	Mtkm	2	10	10	2	10	1	1	1	1	1	5	12	2	5	22	5	12	12	0
Coll roads	%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PWD roads	%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
River Disposal																				
1	TSS	0	554260	7194286	0	1291900	2609669	0	0	156400	0	0	80	0	0	437000	340000	398237	564565	0

Note Data taken from Annexure 3 6 along with plans for fugitive dust reduction for mine haul roads, colliery roads, and PWD roads (see text for details)

Annexure 3.16 Future conditions (circa 2001) - Scenario III (Planned Improvements + Relocation + Fugitive Dust Contro
basic data for residual generation - cell-wise

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

Cell	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	14000 Units				
	Cookstoves		45 kg/hld	2 t/d	SPM	Low discharge levels
1a-1b	Hld solids		2 kg/hld	28 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES								
Steel Plant	0	t						
Fertilizer Plant	0	t						
Explosive factory	0	t						
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
.							
TRANSPORT							
Rail movements	0						
Road movements (total)					1	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	70	Mpkm	0.02	kg/pkm	1	t/d	SPM
PWD Fht	2	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	14000 Units				
	Cookstoves		45 kg/hld	2 t/d	SPM	Low discharge levels
3-2b	Hld solids		2 kg/hld	28 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0.44 Mt		0 t/d	SW	Washery rejects
	Reject spills	10 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					1	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	70	Mpkm	0.02	kg/pkm	1	t/d	SPM
PWD Fht	2	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.16 contd.

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	59000 Units				
	Cookstoves		45 kg/hld	7 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	118 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	2.5 Mt	1.2 kg/t	8 t/d	SPM	Low discharge levels
	Overburden	10.8 Mm³				
	Underground	0.5 Mt				
	Land damaged due to mining					
	Working Pits			100 ha	Land	
	Overburden dumps			43 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			300 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	3.4 Mt				
	Rejects	0.63 Mt		1719 t/d	SW	Washery rejects
	Reject spills	10 %		172 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	832 GWh	0 02 kg/kWh	46 t/d	SPM	High level discharge
	Flyash trapped			465 t/d	SW	Converted to LW
	Bottom ash			128 t/d	SW	Converted to LW
	Ash spills			59 t/d	LW	Ash slurry
	PP-2 Emissions	3311 GWh	0 02 kg/kWh	181 t/d	SPM	High level discharge
	Flyash trapped			1633 t/d	SW	Converted to LW
	Bottom ash			454 t/d	SW	Converted to LW
	Ash spills			209 t/d	LW	Ash slurry
	PP-3 Emissions	140 GWh	0.05 kg/kWh	19 t/d	SPM	High level discharge
	Flyash trapped			309 t/d	SW	Converted to LW
	Bottom ash			82 t/d	SW	Converted to LW
	Ash spills			20 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	40000	t					
Hard coke	0	t	5 4	kg/t	0	t/d	SPM
Softcoke	9000	t	39	kg/t	1	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					5	t/d	SPM
Colliery roads	15	Mtkm	0.12	kg/pkm	2	t/d	SPM
PWD pas	295	Mpkm	0.02	kg/pkm	3	t/d	SPM
PWD Fht	10	Mtkm	0 04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0 004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					554260	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

ınexure 3.16 contd.

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	39000 Units				
	Cookstoves		45 kg/hld	5 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	78 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	3.2 Mt	1.2 kg/t	11 t/d	SPM	Low discharge levels
	Overburden	7.3 Mm^3				
	Underground	0.5 Mt				
	Land damaged due to mining					
	Working Pits			128 ha	Land	
	Overburden dumps			29 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			300 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	2.4 Mt				
	Rejects	0.63 Mt		1196 t/d	SW	Washery rejects
	Reject spills	10 %		120 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES						
Steel Plant	0	t				
Fertilizer Plant	0	t				
Explosive factory	0	t				
Hard coke	0	t	5 4	kg/t	0 t/d	SPM
Softcoke	0	t	39	kg/t	0 t/d	SPM
TRANSPORT						
Rail movements	0					
Road movements (total)					4 t/d	SPM
Colliery roads	19	Mtkm	0.12	kg/pkm	2 t/d	SPM
PWD pas	195	Mpkm	0.02	kg/pkm	2 t/d	SPM
PWD Fht	10	Mtkm	0.04	kg/tkm	0 t/d	SPM
NH-Pas	0	Mpkm	0 004	kg/pkm	0 t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0 t/d	SPM
River Disposal						
					7194286 kg/d	TSS
					0 kg/d	COD
					0 kg/d	BOD
					0 kg/d	TSS
					0 kg/d	COD
					0 kg/d	BOD
					0 kg/d	TSS
					0 kg/d	COD
					0 kg/d	BOD

Annexure 3.16 contd.

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	49000 Units				
	Cookstoves		45 kg/hld	6 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	98 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	4.5 Mt	1.2 kg/t	15 t/d	SPM	Low discharge levels
	Overburden	7 Mm³				
	Underground	0.2 Mt				
	Land damaged due to mining					
	Working Pits			180 ha	Land	
	Overburden dumps			28 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			300 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	133000	t	39	kg/t	14	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					5	t/d	SPM
Colliery roads	24	Mtkm	0 12	kg/pkm	3	t/d	SPM
PWD pas	245	Mpkm	0 02	kg/pkm	2	t/d	SPM
PWD Fht	10	Mtkm	0 04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					1291900	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.16 contd.

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

Cell 2d

Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
HOUSEHOLDS	7000 Units				
Cookstoves		45 kg/hld	1 t/d	SPM	Low discharge levels
Hld solids		2 kg/hld	14 t/d	SW	Household solid waste
COAL MINING					
Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
Overburden	0 Mm³				
Underground	0 Mt				
Land damaged due to mining					
Working Pits			0 ha	Land	
Overburden dumps			0 ha	Land	
Coal dumps			0 ha	Land	
Subsided land			0 ha	Land	
Mine fires			0 ha	Land	
Abandoned Pits			0 ha	Land	
Reclaimed land			0 ha	Land	
RIVER MINING					
Sand	0 Mt		0 Mt	Sand	
COAL WASHERIES	0 Mt				
Rejects	0 Mt		0 t/d	SW	Washery rejects
Reject spills	0 %		0 t/d	LW	rejects slurry
Coal spills	0 %		0 t/d	LW	coalfines slurry
POWER PLANTS					
PP-1 Emissions	3416 GWh	0.02 kg/kWh	187 t/d	SPM	High level discharge
Flyash trapped			1984 t/d	SW	Converted to LW
Bottom ash			543 t/d	SW	Converted to LW
Ash spills			1263 t/d	LW	Ash slurry
PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5 4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					0	t/d	SPM
Colliery roads	0	Mtkm	0 12	kg/pkm	0	t/d	SPM
PWD pas	35	Mpkm	0.02	kg/pkm	0	t/d	SPM
PWD Fht	1	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					2609669	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

ɜxure 3.16 contd.

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity		Estimated unit Discharge		Estimated or Reported Discharge		Parameter	Comments
ɜell	HOUSEHOLDS	7000	Units						
	Cookstoves			45	kg/hld	1	t/d	SPM	Low discharge levels
	Hld solids			2	kg/hld	14	t/d	SW	Household solid waste
	COAL MINING								
	Open Cast	8.2	Mt	1 2	kg/t	27	t/d	SPM	Low discharge levels
	Overburden	15.5	Mm^3						
	Underground	0.3	Mt						
	Land damaged due to mining								
	Working Pits					328	ha	Land	
	Overburden dumps					62	ha	Land	
	Coal dumps					0	ha	Land	
	Subsided land					0	ha	Land	
	Mine fires					0	ha	Land	
	Abandoned Pits					0	ha	Land	
	Reclaimed land					500	ha	Land	
	RIVER MINING								
	Sand	0	Mt			0	Mt	Sand	
	COAL WASHERIES	2.8	Mt						
	Rejects	0	Mt			2466	t/d	SW	Washery rejects
	Reject spills	0	%			0	t/d	LW	rejects slurry
	Coal spills	0	%			0	t/d	LW	coalfines slurry
	POWER PLANTS								
	PP-1 Emissions	140	GWh	0.05	kg/kWh	19	t/d	SPM	High level discharge
	Flyash trapped					309	t/d	SW	Converted to LW
	Bottom ash					82	t/d	SW	Converted to LW
	Ash spills					20	t/d	LW	Ash slurry
	PP-2 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry
	PP-3 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	4300	t	5 4	kg/t	0	t/d	SPM
Softcoke	6500	t	39	kg/t	1	t/d	SPM
.							
TRANSPORT							
Rail movements	0						
Road movements (total)					5	t/d	SPM
Colliery roads	42	Mtkm	0 12	kg/pkm	5	t/d	SPM
PWD pas	35	Mpkm	0.02	kg/pkm	0	t/d	SPM
PWD Fht	1	Mtkm	0 04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity		Estimated unit Discharge		Estimated or Reported Discharge		Parameter	Comments
Cell	HOUSEHOLDS	7000	Units						
	Cookstoves			45	kg/hld	1	t/d	SPM	Low discharge levels
	Hld solids			2	kg/hld	14	t/d	SW	Household solid waste
	COAL MINING								
	Open Cast	3.2	Mt	1.2	kg/t	11	t/d	SPM	Low discharge levels
	Overburden	4.1	Mm³						
	Underground	2.5	Mt						
	Land damaged due to mining								
	Working Pits					128	ha	Land	
	Overburden dumps					16	ha	Land	
	Coal dumps					0	ha	Land	
	Subsided land					0	ha	Land	
	Mine fires					0	ha	Land	
	Abandoned Pits					0	ha	Land	
	Reclaimed land					0	ha	Land	
	RIVER MINING								
	Sand	0	Mt			0	Mt	Sand	
	COAL WASHERIES	0	Mt						
	Rejects	ERR	Mt			0	t/d	SW	Washery rejects
	Reject spills	ERR	%			0	t/d	LW	rejects slurry
	Coal spills	ERR	%			0	t/d	LW	coalfines slurry
	POWER PLANTS								
	PP-1 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry
	PP-2 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry
	PP-3 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
	Flyash trapped					0	t/d	SW	Converted to LW
	Bottom ash					0	t/d	SW	Converted to LW
	Ash spills					0	t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	18000	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					3	t/d	SPM
Colliery roads	29	Mtkm	0.12	kg/pkm	3	t/d	SPM
PWD pas	35	Mpkm	0.02	kg/pkm	0	t/d	SPM
PWD Fht	1	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.16 contd.

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	7000 Units				
	Cookstoves		45 kg/hld	1 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	14 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	0.4 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	ERR Mt		0 t/d	SW	Washery rejects
	Reject spills	ERR %		0 t/d	LW	rejects slurry
	Coal spills	ERR %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5 4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					7	t/d	SPM
Colliery roads	2	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	35	Mpkm	0.02	kg/pkm	0	t/d	SPM
PWD Fht	1	Mtkm	0 04	kg/tkm	0	t/d	SPM
NH-Pas	55	Mpkm	0.004	kg/pkm	1	t/d	SPM
NH-Fht	255	Mtkm	0.008	kg/tkm	6	t/d	SPM
River Disposal							
					156400	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.16 contd.

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

Activity	Level of Activity		Estimated unit Discharge		Estimated or Reported Discharge		Parameter	Comments
HOUSEHOLDS	5000	Units						
Cookstoves			45	kg/hld	1	t/d	SPM	Low discharge levels
Hld solids			2	kg/hld	10	t/d	SW	Household solid waste
COAL MINING								
Open Cast	1.35	Mt	1.2	kg/t	4	t/d	SPM	Low discharge levels
Overburden	3.4	Mm³						
Underground	4.5	Mt						
Land damaged due to mining								
Working Pits					54	ha	Land	
Overburden dumps					14	ha	Land	
Coal dumps					0	ha	Land	
Subsided land					0	ha	Land	
Mine fires					0	ha	Land	
Abandoned Pits					0	ha	Land	
Reclaimed land					300	ha	Land	
RIVER MINING								
Sand	0	Mt			0	Mt	Sand	
COAL WASHERIES	0 72	Mt						
Rejects	ERR	Mt			0	t/d	SW	Washery rejects
Reject spills	ERR	%			0	t/d	LW	rejects slurry
Coal spills	ERR	%			0	t/d	LW	coalfines slurry
POWER PLANTS								
PP-1 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
Flyash trapped					0	t/d	SW	Converted to LW
Bottom ash					0	t/d	SW	Converted to LW
Ash spills					0	t/d	LW	Ash slurry
PP-2 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
Flyash trapped					0	t/d	SW	Converted to LW
Bottom ash					0	t/d	SW	Converted to LW
Ash spills					0	t/d	LW	Ash slurry
PP-3 Emissions	0	GWh	0	kg/kWh	0	t/d	SPM	High level discharge
Flyash trapped					0	t/d	SW	Converted to LW
Bottom ash					0	t/d	SW	Converted to LW
Ash spills					0	t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	108600	t	5 4	kg/t	2	t/d	SPM
Softcoke	8100	t	39	kg/t	1	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					10	t/d	SPM
Colliery roads	34	Mtkm	0.12	kg/pkm	4	t/d	SPM
PWD pas	25	Mpkm	0 02	kg/pkm	0	t/d	SPM
PWD Fht	1	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	55	Mpkm	0.004	kg/pkm	1	t/d	SPM
NH-Fht	255	Mtkm	0.008	kg/tkm	6	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.16 contd.

Cell 4a-4b

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
HOUSEHOLDS	30000 Units				
Cookstoves		45 kg/hld	4 t/d	SPM	Low discharge levels
Hld solids		2 kg/hld	60 t/d	SW	Household solid waste
COAL MINING					
Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
Overburden	0 Mm³				
Underground	0 Mt				
Land damaged due to mining					
Working Pits			0 ha	Land	
Overburden dumps			0 ha	Land	
Coal dumps			0 ha	Land	
Subsided land			0 ha	Land	
Mine fires			0 ha	Land	
Abandoned Pits			0 ha	Land	
Reclaimed land			0 ha	Land	
RIVER MINING					
Sand	0 Mt		0 Mt	Sand	
COAL WASHERIES	0 Mt				
Rejects	ERR Mt		0 t/d	SW	Washery rejects
Reject spills	ERR %		0 t/d	LW	rejects slurry
Coal spills	ERR %		0 t/d	LW	coalfines slurry
POWER PLANTS					
PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	400000	t	5 4	kg/t	6	t/d	SPM
Softcoke	300000	t	39	kg/t	32	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					24	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	150	Mpkm	0.02	kg/pkm	2	t/d	SPM
PWD Fht	5	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	533	Mpkm	0.004	kg/pkm	5	t/d	SPM
NH-Fht	764	Mtkm	0.008	kg/tkm	17	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.16 contd.

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	26000 Units				
	Cookstoves		45 kg/hld	3 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	52 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0.4 Mt	1.2 kg/t	1 t/d	SPM	Low discharge levels
	Overburden	0.7 Mm^3				
	Underground	0 6 Mt				
	Land damaged due to mining					
	Working Pits			16 ha	Land	
	Overburden dumps			3 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			300 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0.9 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	19300	t	39	kg/t	2	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					2	t/d	SPM
Colliery roads	5	Mtkm	0.12	kg/pkm	1	t/d	SPM
PWD pas	130	Mpkm	0.02	kg/pkm	1	t/d	SPM
PWD Fht	2	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	1	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments*
Cell	HOUSEHOLDS	48000 Units				
	Cookstoves		45 kg/hld	6 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	96 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	2.6 Mt	1.2 kg/t	9 t/d	SPM	Low discharge levels
	Overburden	5.9 Mm^3				
	Underground	2.5 Mt				
	Land damaged due to mining					
	Working Pits			104 ha	Land	
	Overburden dumps			24 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			1100 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0.4 Mt				
	Rejects	0 Mt		244 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	103000	t	5.4	kg/t	2	t/d	SPM
Softcoke	22600	t	39	kg/t	2	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					13	t/d	SPM
Colliery roads	35	Mtkm	0 12	kg/pkm	4	t/d	SPM
PWD pas	240	Mpkm	0.02	kg/pkm	2	t/d	SPM
PWD Fht	12	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	55	Mpkm	0.004	kg/pkm	1	t/d	SPM
NH-Fht	255	Mtkm	0.008	kg/tkm	6	t/d	SPM
River Disposal							
					80	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	28000 Units				
	Cookstoves		45 kg/hld	3 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	56 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5 4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					6	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	140	Mpkm	0.02	kg/pkm	1	t/d	SPM
PWD Fht	5	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	189	Mpkm	0.004	kg/pkm	2	t/d	SPM
NH-Fht	135	Mtkm	0 008	kg/tkm	3	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	105000 Units				
	Cookstoves		45 kg/hld	13 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	210 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	4000000	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					11	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	525	Mpkm	0.02	kg/pkm	5	t/d	SPM
PWD Fht	22	Mtkm	0 04	kg/tkm	0	t/d	SPM
NH-Pas	189	Mpkm	0.004	kg/pkm	2	t/d	SPM
NH-Fht	135	Mtkm	0 008	kg/tkm	3	t/d	SPM
River Disposal							
					437000	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.16 contd.

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	28000 Units				
	Cookstoves		45 kg/hld	3 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	56 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	0 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	0 Mt		0 Mt	Sand	
	COAL WASHERIES	0 Mt				
	Rejects	0 Mt		0 t/d	SW	Washery rejects
	Reject spills	0 %		0 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES								
Steel Plant	0	t						
Fertilizer Plant	0	t						
Explosive factory	0	t						
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					14	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	140	Mpkm	0.02	kg/pkm	1	t/d	SPM
PWD Fht	5	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	110	Mpkm	0.004	kg/pkm	1	t/d	SPM
NH-Fht	510	Mtkm	0.008	kg/tkm	11	t/d	SPM
River Disposal							
					340000	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d .	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.16 contd.

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	54000 Units				
	Cookstoves		45 kg/hld	7 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	108 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0.25 Mt	1.2 kg/t	1 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	3.1 Mt				
	Land damaged due to mining					
	Working Pits			10 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			500 ha	Land	
	RIVER MINING					
	Sand	0.7 Mt		1 Mt	Sand	
	COAL WASHERIES	5.91 Mt				
	Rejects	0.81 Mt		2213 t/d	SW	Washery rejects
	Reject spills	10 %		221 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	175 GWh	0 05 kg/kWh	24 t/d	SPM	High level discharge
	Flyash trapped			321 t/d	SW	Converted to LW
	Bottom ash			86 t/d	SW	Converted to LW
	Ash spills			20 t/d	LW	Ash slurry
	PP-2 Emissions	140 GWh	0.05 kg/kWh	19 t/d	SPM	High level discharge
	Flyash trapped			309 t/d	SW	Converted to LW
	Bottom ash			82 t/d	SW	Converted to LW
	Ash spills			20 t/d	LW	Ash slurry
	PP-3 Emissions	140 GWh	0.05 kg/kWh	19 t/d	SPM	High level discharge
	Flyash trapped			309 t/d	SW	Converted to LW
	Bottom ash			82 t/d	SW	Converted to LW
	Ash spills			20 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	46000	t	5.4	kg/t	1	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					6	t/d	SPM
Colliery roads	29	Mtkm	0.12	kg/pkm	3	t/d	SPM
PWD pas	270	Mpkm	0.02	kg/pkm	3	t/d	SPM
PWD Fht	12	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal					398237	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.16 contd.

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

	Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
Cell	HOUSEHOLDS	66000 Units				
	Cookstoves		45 kg/hld	8 t/d	SPM	Low discharge levels
	Hld solids		2 kg/hld	132 t/d	SW	Household solid waste
	COAL MINING					
	Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
	Overburden	0 Mm³				
	Underground	0 5 Mt				
	Land damaged due to mining					
	Working Pits			0 ha	Land	
	Overburden dumps			0 ha	Land	
	Coal dumps			0 ha	Land	
	Subsided land			0 ha	Land	
	Mine fires			0 ha	Land	
	Abandoned Pits			0 ha	Land	
	Reclaimed land			0 ha	Land	
	RIVER MINING					
	Sand	1.3 Mt		1 Mt	Sand	
	COAL WASHERIES	3.11 Mt				
	Rejects	0 98 Mt		2687 t/d	SW	Washery rejects
	Reject spills	10 %		269 t/d	LW	rejects slurry
	Coal spills	0 %		0 t/d	LW	coalfines slurry
	POWER PLANTS					
	PP-1 Emissions	266 GWh	0.03 kg/kWh	22 t/d	SPM	High level discharge
	Flyash trapped			211 t/d	SW	Converted to LW
	Bottom ash			58 t/d	SW	Converted to LW
	Ash spills			27 t/d	LW	Ash slurry
	PP-2 Emissions	70 GWh	0.05 kg/kWh	10 t/d	SPM	High level discharge
	Flyash trapped			155 t/d	SW	Converted to LW
	Bottom ash			41 t/d	SW	Converted to LW
	Ash spills			10 t/d	LW	Ash slurry
	PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
	Flyash trapped			0 t/d	SW	Converted to LW
	Bottom ash			0 t/d	SW	Converted to LW
	Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES				
Steel Plant	0 t			
Fertilizer Plant	300000 t			
Explosive factory	0 t			
Hard coke	0 t	5.4 kg/t	0 t/d	SPM
Softcoke	0 t	39 kg/t	0 t/d	SPM
TRANSPORT				
Rail movements	0			
Road movements (total)			5 t/d	SPM
Colliery roads	9 Mtkm	0.12 kg/pkm	1 t/d	SPM
PWD pas	330 Mpkm	0.02 kg/pkm	3 t/d	SPM
PWD Fht	12 Mtkm	0.04 kg/tkm	0 t/d	SPM
NH-Pas	0 Mpkm	0.004 kg/pkm	0 t/d	SPM
NH-Fht	0 Mtkm	0.008 kg/tkm	0 t/d	SPM
River Disposal			564565 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD
			0 kg/d	TSS
			0 kg/d	COD
			0 kg/d	BOD

ıxure 3.16 contd.

FUTURE-3 (Planned Improvements + Relocation + Fugitive Dust Control)

Activity	Level of Activity	Estimated unit Discharge	Estimated or Reported Discharge	Parameter	Comments
HOUSEHOLDS	15000 Units				
Cookstoves		45 kg/hld	2 t/d	SPM	Low discharge levels
Hld solids		2 kg/hld	30 t/d	SW	Household solid waste
COAL MINING					
Open Cast	0 Mt	0 kg/t	0 t/d	SPM	Low discharge levels
Overburden	0 Mm³				
Underground	0 Mt				
Land damaged due to mining					
Working Pits			0 ha	Land	
Overburden dumps			0 ha	Land	
Coal dumps			0 ha	Land	
Subsided land			0 ha	Land	
Mine fires			0 ha	Land	
Abandoned Pits			0 ha	Land	
Reclaimed land			0 ha	Land	
RIVER MINING					
Sand	0 Mt		0 Mt	Sand	
COAL WASHERIES	0 Mt				
Rejects	0 Mt		0 t/d	SW	Washery rejects
Reject spills	0 %		0 t/d	LW	rejects slurry
Coal spills	0 %		0 t/d	LW	coalfines slurry
POWER PLANTS					
PP-1 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-2 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry
PP-3 Emissions	0 GWh	0 kg/kWh	0 t/d	SPM	High level discharge
Flyash trapped			0 t/d	SW	Converted to LW
Bottom ash			0 t/d	SW	Converted to LW
Ash spills			0 t/d	LW	Ash slurry

OTHER INDUSTRIES							
Steel Plant	0	t					
Fertilizer Plant	0	t					
Explosive factory	0	t					
Hard coke	0	t	5.4	kg/t	0	t/d	SPM
Softcoke	0	t	39	kg/t	0	t/d	SPM
TRANSPORT							
Rail movements	0						
Road movements (total)					1	t/d	SPM
Colliery roads	0	Mtkm	0.12	kg/pkm	0	t/d	SPM
PWD pas	75	Mpkm	0 02	kg/pkm	1	t/d	SPM
PWD Fht	0	Mtkm	0.04	kg/tkm	0	t/d	SPM
NH-Pas	0	Mpkm	0.004	kg/pkm	0	t/d	SPM
NH-Fht	0	Mtkm	0.008	kg/tkm	0	t/d	SPM
River Disposal							
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD
					0	kg/d	TSS
					0	kg/d	COD
					0	kg/d	BOD

Annexure 3.19 Future conditions (circa 2001) - Management Strategy III (Planned Improvements + Relocation + Fugitive Dust Control) - Mortality calculations of expected number of lives prolonged

Bihar state mortality rate = 1.08%
Mortality rate reduction per $\mu g/m^3$ of reduction in respiratory particulate matter (RPM) = 0.125%

Cell No.	Ambient exposure (μg/m3) SPM				Incremental change (μg/m3) of RPM			Number of lives prolonged		
	Present circa 1991	Future I circa 2001	Future II circa 2001	Future III circa 2001	Future I	Future II	Future III	Future I	Future II	Future III
1a-1b	230	239	243	175	-3	-4	18	-3	-4	17
1c	240	244	233	175	-1	2	22	-5	10	86
1d	294	275	275	175	6	6	40	21	16	104
2a-2b	295	339	339	204	-15	-15	31	-14	-14	29
2c	410	348	348	224	21	21	62	68	68	205
2d	425	425	425	275	0	0	50	0	0	24
3a	456	541	541	175	-28	-28	94	-13	-13	44
3b	425	532	532	175	-36	-36	83	-17	-17	39
3c	529	541	541	305	-4	-4	75	-2	-2	35
3d	508	550	550	281	-14	-14	76	-7	-5	26
4a-4b	436	352	347	258	28	30	59	53	60	120
4c	540	467	446	275	24	31	88	99	101	286
4d	311	286	281	206	9	10	35	8	18	62
5	245	275	275	175	-10	-10	23	-19	-19	44
6	375	396	396	256	-7	-7	40	-51	-51	281
7	325	339	339	225	-5	-5	33	-9	-9	63
8a	369	338	328	225	10	14	48	42	50	175
8b	362	275	275	180	29	29	61	117	129	271
8c-8d	242	242	242	175	0	0	22	0	0	22
Total								**268**	**319**	**1933**

Annexure 3.20 (Planned ... rticulate matter (SPM) contribution to air quality

Cell	Annual average ambient concentration ($\mu g/m^3$)	Percentage contribution of SPM to ambient air quality				
		Coal mining	Household cooking	Transport	Power	Other
1a-1b	175	0	59	26	15	0
1c	175	35	31	21	9	4
1d	175	48	22	19	11	0
2a-2b	200	0	64	28	8	0
2c	200	35	14	12	6	33
2d	300	0	64	28	8	0
3a	300	76	2	14	5	2
3b	340	67	6	22	3	2
3c	325	0	10	80	9	0
3d	225	24	3	55	3	14
4a-4b	350	0	5	35	5	55
4c	250	15	36	22	5	23
4d	200	26	18	38	7	12
5	175	0	31	57	11	0
6	200	0	51	42	7	0
7	200	0	18	70	12	0
8a	200	5	43	40	8	4
8b	175	0	60	34	6	0
8c-8d	175	0	65	26	9	0